

SINCLAIR

QL

WORLD

Volume 2: Number 9

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Most Secret Puzzle

QVME

ultra QL emulator

EEEEK!

DIY Mice!

LINE

DESIGN

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This month and next month!

Dilwyn Jones' Very Basic SuperBasic, Alan Bridewell's Beginners' Machine Code, Di-Ren's QL/PC File Server, QMaths2, Hugh H Howie's proposal for a Sinclair Show in Canada, and our article on Neural Networks on the QL have been held over for lack of space this month. Look for them next month, which we hope will be sooner than last month ...

Trouble shooter

Bryan Davies with speed test data and other offers from user groups.

Eros Forenzi has sent Issue 25 of the QItaly user group magazine, together with a list of additional results for tests using his QL Speed Index benchmark routine. A complete listing of all the results I have available is given in Figure one. Other figures relating to that illustration are:

QL Index = speed of the machine relative to a standard 128K QL

GC Index = speed of the machine relative to a 16 MHz Gold Card QL

Absolute Index = absolute speed of the machine (16 MHz Gold Card = 100)

Qliper

Thank you to whoever in Spain sent the disk of **Qliper 41**, the disk magazine, produced by the **Spanish QL users' group** (see INFORMATION below). As with the QItaly magazine, some of it is readable even when one does not speak Spanish, but it was necessary to call in my resident translator (or wife) to shed some light on much of it. The main text file ran to 60 pages when loaded into Text87! The subjects covered in this document spanned a wide range, such as Dave Walker's C-68, Coherent C (both in English), a co-operative project with Russians to develop a computer (not sure about that), and the club's expenditures.

The disk contains 25 files, several of them programs. This is no small enterprise; as with the QItaly magazine, it came as a surprise to find that QL enthusiasts in another country devote so much energy to producing a disk magazine, and come up with something that must be well worth reading for the club members.

Disk Power

There has been a regular stream of letters about floppy **disk drive wiring** over the years, and one area of uncertainty is that of DC power input. The drives we use all require +5V, and some require +12V in addition to that. It is dangerous to be dogmatic about which type has +12V, but my own 3.5-inch DD and HD drives both use it, and 5.25-inch drives of all densities presumably use it. On the other hand, 3.5-inch ED drives do not use it, and you will find that the ED units from Miracle Systems have only the +5V supply in them, and they are not suited for modification to provide +12V in addition; this is pointed out for those, like myself, unwise enough to try replacing one of the ED drives with an HD in the ED unit. As far as I am aware, the +5V line is always at one edge of the power connector, and the +12V - if present - is at the other edge.

Users with ED or HD drives can use both DiscOver

and Multi-DiscOver for transferring files between Qdos and MS-DOS formats. All normal disk capacities up to the full 2.88 or 3.2 MB are supported.

XChange

Now that this Psion "super quartet" suite is freely available to QL users, people who use the original, stand-alone Psion programs should find it well worthwhile contacting the Midlands Quanta Group (see INFORMATION) for a copy. Do not expect extra-special versions of the four basic programs, because **XChange V3.90** does not have them. In fact, both the Archive and the Quill supplied are said to be versions slightly earlier than the latest separate ones. The only drawbacks this brings, according to the documentation supplied, is that the Quill cursor sometimes ends up in the wrong position (this can be fixed by a refresh of the screen) and the Archive Index limit is the old 32K. The Archive version sounds to be an early Archdev, and it will not load Archive _PRO files, but it does load the normal .PRG files; it presumably also loads _PRO files created with Archdev 2.38.

There are various merits to using XChange. The current release can be started with the EX or EXEC command, and is able to be switched like other EXEC-able programs. Within XChange, you

can switch between the familiar four programs. There is a Glossary function, comparable to that in Turbo Quill, enabling series of keypresses to be saved and recalled. The Task Sequencing Language (TSL) might these days be called a macro language; it enables the user to send commands and text to the programs. It is somewhat like being able to use Basic to control programs. You can send codes for normal control keys - eg F3, Enter - print messages to the screen, create pauses or wait for keyboard input etc. Overall operation is stated to be rather faster than that of the standard, separate programs.

On a Gold Card system, performance is distinctly nippy. Many of us would not have looked elsewhere had this kind of functionality and performance been available a few years ago (assuming supplier and price had been acceptable, of course).

Readers' Letters

John Mason requested a copy of the **QL Speed** benchmark test procedure, devised by Eros Forenzi (see above), and one has been sent to him for use by members of the Dorset Quanta group. You can have a copy of the procedure, if you send a formatted blank 3.5-inch disc and a stamped, addressed return envelope to me, care of the QL World office.

INFORMATION

Psion XChange:
QL User Group (WM)
16 Westfield Road
Birmingham B27 7TL

Qlity Club and QL Speed Index:

Eros Forenzi
Via Valeriana 44
23010 Berbenno (SO)
Italy.
Tel. +39 342 590450 (after 1900
hours GMT)

QLiper, Spanish QL Users' Group:

QLiper
Acacias 44 (Montecarlo)
E-28223 Pozuelo de Alarcon
Spain.

DiscOver £20, Multi-DiscOver £30:

Dilwyn Jones Computing
41 Bro Emrys
Tal-y-Bont
Bangor Gwynedd LL57 3YT.
Tel. (0248) 354023

	TIME (seconds)	QL INDEX	GC INDEX	ABSOLUTE SPEED (GC=100)
Standard 128 KB QL	800	1.00	0.15	15.38
QL + PCML 256 KB + MP QMEM internal 256 KB = 640 KB	568	1.41	0.22	21.65
QL SuperQboard	550	1.45	0.22	22.36
QL 512 KB Expanderam	588	1.36	0.21	20.92
QL Trump Card 1	586	1.37	0.21	20.99
QL Trump Card 2	467	1.71	0.26	26.34
16 MHz Gold Card	123	6.50	1.00	100.00
24 MHz Gold Card	83	9.64	1.48	148.19
QXL 68EC040, cache on, 20 MHz, SMSQ beta-test	30	26.66	4.10	410.00
QXL, V2.00 (?) software	35	22.86	3.51	351.00
Atari ST-QL Emulator	230	3.49	0.53	53.48
Atari Mega Ste Qvme	122	6.57	1.01	100.82
Atari ST-QL Emulator 68030/32 MHz	50	16.24	2.46	246.00
Amiga-QL V3.21 in				
Amiga 500 Exp. 512 KB	334	2.40	0.37	36.83

Trouble Shooter

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8049 ICP.....£8 MDV ULA.....£12

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(First interface purchase includes free 15D/9D lead)

Prices include post & packing (QL only). Payment by Mastercard/Visa/Access/Burocard/cheque/postal order/PO
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OpenChannel

Open Channel is where you have the opportunity to voice your opinions in Sinclair QL World. Whether you want to ask for help with a technical problem, provide somebody with an answer, or just sound off about something which bothers you, write to: Open Channel, QL World, The Blue Barn, Tew Lane, Wootton, Woodstock OX7 1HA.

Tragic Loss

Having just had a QL **lost** and presumably gone for ever between a repairer and myself, I would strongly advise anyone sending a QL not only to send it by the "Certificate of Posting" method, but also to insist that the repairer returns it in the same way. When you think of the loss in money terms, it is worth the extra few pounds. "Certificate of posting" insurance covers up to £150.

In my case it was even costlier. There was the QL with keyboard interface, about £150, and the cost of repair, £25. Plus a separate keyboard that is now useless, about £30. The total is around £200, so I would gladly have accepted the £150 insurance that the "Certificate of posting" would have entitled me to.

**G F Fisher
Bristol**

This is a tragedy, but a surprisingly uncommon one. Even QLs sent from abroad are not usually lost, although sometimes they are damaged or held up at customs.

Is your repairer investigating through the post office? There should have been a sender's address on the package, as well as yours. Properly packed and addressed items genuinely lost by the post office are

rarer than people realise. A QL is not usually an immediate target for a one-off theft. Most businesses send valuable items by carrier, or by recorded delivery or some similar certificate, so that they have proof of posting. Ask him what his local post office is doing to trace your QL, and if necessary ask them yourself.

Even if you cannot get the guarantee of a certificate of posting, it is a good idea to ask a prospective service company what they do about postal security, and endeavour to get a satisfactory answer, before you send your machine.

Lost Adventure

Can anybody tell me where I could beg, borrow, buy or steal a copy of the Quill Adventure Writing System, which was I believe written by Gilsoft. Nobody seems to supply it at present, although I have seen adventures using it.

**G Reynolds
Blundellsands
Liverpool**

Mr. Reynolds is the new contact for the Merseyside QL User Group, so anyone who can help him with the Adventure Writing System (or who wants to know more about QMUG!) can phone him on 051 932 1484, evenings.

Keyboard Mourn

Since writing my review of the Keyboard 90 Interface, some impatient delving in the innards of my QL has resulted in the loss of my Q-Power regulator and the interface. (That'll teach me to tinker with the power on!) I'm now reduced to using the old QL keyboard and regulator ship until replacements can be organised, and the benefits of the PC-style keyboard are more apparent than ever!

**Alex Munden
London**

What did your mother tell you about switching the power off first?

Xchange Bug

In **QL World** Vol. 2.7, your reviewer of PD Xchange concludes that a bug in the Abacus AMEND command in some systems is probably due to Minerva. In fact, there is a bug in Xchange whereby a command to increment the flag at \$89C(A5) actually increments the absolute address \$89C. Since this address is normally in rom, the bug goes unnoticed, but with Gold Card the operating system is copied in ram, leading to a crash.

In my version of Xchange, obtained from the West Midlands QL Group, the bug can be fixed by changing the four hex bytes, starting at byte 41194, from 52,39,00,00 to 06,2D,00,01.

**Ron Stewart
Harrogate
N. Yorks**

Printer Help

Seeing as how I've benefited from Jean-Yves programming and contributions in the past - if he can send a copy of the control codes from his printer manual, I'll knock out a driver for him. It's really quite simple to get any printer to respond to your every wish (if it can!). He may also wish to note that graphics dumps can also be enhanced by Dilwyn Jones' Trans24 filter.

**Tony Rushton
Genesis Consulting
Broadstairs**

Write to us, Jean-Yves!

Hymn to Turbo

It's not very often I feel compelled to sing the praises of software, but this is one time I feel praises are due, not only for the excellent **Turbo**, but also for Digital Precision's helpful backup service. As Turbo has a manual sufficient to fill up to two one-inch binders, this is more than a "load in your Basic program, type CHARGE and watch it do its job" type of program. (Having said that, it does that just as efficiently, if that is all you want to do.)

The manual(s) cover all the keywords in most cases giving an example routine. Not for the faint hearted! But a letter to DP giving a rough idea what I am trying to do, together with a return paid envelope, has given me lots of ideas to work with. I am only a self-trained QL addicts, but I am slowly getting there.

It is difficult to imagine that Turbo, when you con-

sider all its functions, costs a mere £80. As I have said, I know as much about computer programming as certain politicians know about running this country. Nasty but true! What I would like to see is a series dedicated to Turbo. That way, people like myself can get yet more benefit from Turbo. What do other people think? Also Linedesign seems to warrant more than a simple review - a few months of advice and tips seems appropriate, from my point of view.

The purpose of this letter is to use your Open Channel to say thank you to Digital Precision for their kind help of the last few weeks. I look forward to my QL arriving - keep up the good work.

Alan Ingrei
Peterborough

On All Sides!

Please spare a few column inches to reply to inaccuracies in two letters in **Open Channel** Vol. 2.7 (second incarnation!).

First, Simon Goodwin referred to the Sidewinder program. He has confused Sidewinder - a more expensive screen dump program by Steve Jones - with Sidewriter, the program he refers to for printing spreadsheets.

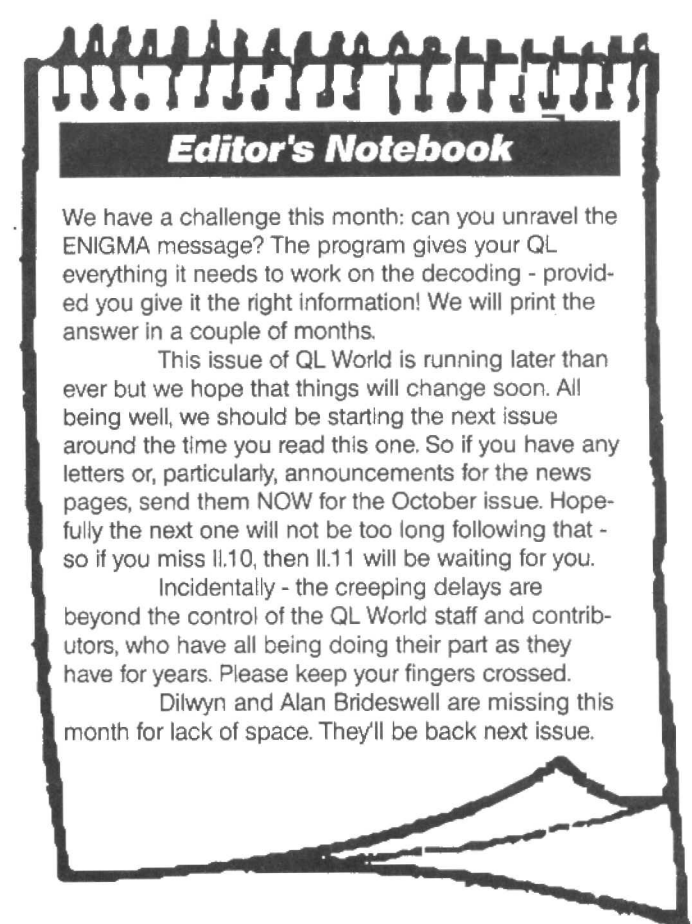
Second, Phil Stickley claims that the Sermouse device is "not a straightforward plug-in operation" and "will not work on a standard QL with another device connected to Ser1 until the machine is modified." This is in fact true only in a small number of cases, and is explained in the instructions I supply with the Hessler Sermouse. The reason for the problems is that because the current has to be drawn through a resistor, the voltage can drop too low for one or both of the devices to operate correctly as the current consumption

rises through both serial ports.

If the total exceeds the permissible amount, alteration of the power source may then be necessary as described. But I regularly use two different mice in SER2 and a Miracle parallel printer lead in SER1 on both my QLs, with no problem. The mice I use are a black E6QMouse (Super Mouse II - the type normally supplied with the package) and a white GM6 Genius Mouse.

The mouse I supply therefore works without problems with the Miracle interface on my QLs, and I have received no complaints about this mouse system at all.

People are vexed with I refuse to supply the driver software by itself, because (for example) they want to get a cheap mouse. In the past I have been on the phone for ages because people have tried to cut corners and run into wiring problems, power problems, and so on. So I have always refused to supply the parts separately - it saves everyone from getting into real difficulties. There are a lot of configuration and different speed control variables to set, and some people write off the system because they cannot find suitable settings, and I'm often on the phone for ages trying to advise people. Suppliers of the Sermouse don't usually bundle the Pointer Environment with it, because it would cost them royalties. It is assumed that if you are buying the Sermouse, you already (or shortly will) have a pointer-driven program which contains the pointer environment anyway, such as Qpac, LineDesgin, Sidewriter, and so on. There may be a misunderstanding here - the mouse with PE software will not be a lot of use unless you have a Pointer Environment program! Whereas some PE programs are usable without a mouse. So the software is



Editor's Notebook

We have a challenge this month: can you unravel the ENIGMA message? The program gives your QL everything it needs to work on the decoding - provided you give it the right information! We will print the answer in a couple of months.

This issue of QL World is running later than ever but we hope that things will change soon. All being well, we should be starting the next issue around the time you read this one. So if you have any letters or, particularly, announcements for the news pages, send them NOW for the October issue. Hopefully the next one will not be too long following that - so if you miss II.10, then II.11 will be waiting for you.

Incidentally - the creeping delays are beyond the control of the QL World staff and contributors, who have all been doing their part as they have for years. Please keep your fingers crossed.

Dilwyn and Alan Brideswell are missing this month for lack of space. They'll be back next issue.

the natural first step for users. Also, the current versions of the driver software can also operate in cursor emulation mode, allowing older cursor-key driven software to be controlled via the mouse in SOME cases.

A hint for people with some types of three-button mouse: a few have a switch on the side to switch between two- and three-button mode. (Beware! in some others the switch locks the mouse into one-direction travel only!) In mice (the majority) which don't have a two/three button switch, the mouse defaults automatically to two-button mode (Microsoft mode) when you power up but be careful! If you are holding down the left mouse button when you switch on, it switches instead to three-button (System Mouse) mode - this can cause some head-scratching if you don't notice it! Now that I know about this facility, it is documented.

Further technical informa-

tion about the SERmouse system can be obtained from Albin Hessler Software, Im Zeilfeld 25, D-72631 Aichtal, Germany. Tel (from UK) is 010 49 7127 56280. Hint: call early evenings or weekends when International charges are lower. Albin - who produced the system - speaks good English for those who do not speak good German!

Dilwyn Jones
DJC Bangor
Wales

We predicted that people would confuse the names of "Sidewriter" and "Sidewinder", and they have, with a vengeance! I have had some bewildered letters from readers who would like to review one or the other but are not sure which! They are, however, quite different programs.

Thank you to Dilwyn for his information about the SERmouse. Phil Stickley, in fact, did not buy his

SERmouse system from DJC. As there is always a potential for compatibility or set-up dilemmas when adding-on interface hardware, have a word with your supplier about compatibility, and also ask if he can direct you to someone who can help with hardware adjustments if you do run into difficulties. But, as Dilwyn points out, these should only be a minority.

Dilwyn's story about the mouse switches puts me in mind of the user who accidentally leaned his manual on the space bar while using Quill - and couldn't for the life of him work out why, next time he looked up, his cursor was floating in the middle of a blank screen with not a landmark in sight for miles in any direction. Head scratching indeed!

Cursor Colours

In response to Gwynne Owen-Smith's question (**QL World** July 1993), I'd like to tell him that it's impossible to change the colour of the cursor on an unexpanded QL. Effectively the mask which sets the colour stands in the rom area of the QL, so it isn't possible to amend it without making a new rom.

Nevertheless, the answer you are actually looking at has been typed in with Quill and a white cursor (or rather, brilliant yellow, as my monitor is a Philips amber one, too.)

How to do this? The only way I know as yet is by using a Gold Card.

As the GC copies the rom contents to its ram area, it is then possible to POKE into the mask location. The most difficult thing to do seems to be to get that particular address, as there are so many rom versions - JM, JS, MGx, etc.

This problem can be solved with the following function:

```
100 DEFine FuNction
    adresse$
```

```
110 LOCAL loop,pointeur
120 pointeur=0
130 REpeat loop
140 IF HEX$(PEEK_L(pointeur),32)="48E7FFFE"
150 IF HEX$(PEEK_W(pointeur+6),16)="2C3C"
160 IF HEX$(PEEK_L(pointeur+8),32)="00FF00FF"
170 RETURN HEX$(pointeur+8),32)
180 END IF
190 END IF
200 END IF
210 pointeur=pointeur+2
220 END REpeat loop
230 END DEFine
```

Then, PRINT adresse\$ will give you the suitable address - in my case, it's 25B0 (MGF QL - a good vintage indeed!)

While we know the correct address, what to POKE into depends on the MODE of the QL and the desired colour.

The list of the masks and their resulting colours is as follows (all values are in hexadecimal):

MODE4: 00000000 Black (very funny - try it on channel #0!); 00FF00FF Red (the original colour - no interest in our case); FF00FF00 Green (aha!); FFFFFFFF White (perhaps the best choice).

MODE8: 00000000 Black; 00550055 Blue; 00AA00AA Red; 00FF00FF Magenta; AA00AA00 Green; AA55AA55 Cyan; AAAAAAAA Yellow; AAFFAAFF White.

For instance, assuming that your MGF QL is in MODE4, and you want for the cursor to be white, just type in POKE_L HEX("25B0"),HEX("FFFFFF").

This SuperBasic line can be easily inserted into the boot file of your favourite program. I hope this trick will help Gwynne and those who, like me, use a monochrome monitor (best thanks to Miracle too).

**Bruno Coatly
Rennes
France**

Thank you, Bruno. As the listing has been retyped, it has been left in the original French. Well, it works for Bruno, who is a QLCF member as well as a Quanta and QL World reader.

Fifi's Bits

In a review of FiFi (File Finder) earlier this year, the reviewer remarked that FiFi was unable to find a text string in a file saved by a DTP program. This may cause readers to think that the program doesn't work properly. In fact, as DTP programs save their files as special format bitmaps, the string would not exist in the file as text, but as a bitmap. If the file is copied to screen, or viewed in Qpac2, it will probably be seen that the text string is nowhere to be found.

**Wolfgang Lenerz
Paris**

Lost Eight

I have not yet received issue 8 of QLWorld as it usually arrives around the middle of the month and I am a little preoccupied with its lateness. I hope this can be cleared up quickly as I miss being able to read my favourite magazine.

I would also like some help on a technical matter. I have just been given a Microvitec Cub colour monitor, ex-BBC, and would like details on modifications and leads needed to get it to work with my QL.

**Peter MG Stevenson
Madrid**

This letter arrived by fax today - we've had a number of calls from Continental readers who haven't received their Issue 8s yet, and we are sending them copies from the office (and making enquiries!)

If anyone has diagrams or information that would

help Peter, please get in touch with us here. Bill Richardson, Tony Firshman and Adman Services have all been able to help people with

Open Channel

NEW NETWORK FROM QUBBESOFT

Qubbesoft PD are on the verge of producing a **brand new networking interface** for the QL. Called the Fast Network, the new board has shown in tests that it can run a network ten times faster than the existing QL network. The hardware board will plug into the QL rom slot, and will work with the Gold Card, Trump Card, SuperQ Board, Toolkit 2 and also on unexpanded QLs.

Unlike the built-in QL network, Fast Network does not require TK2 to run effectively, as it has its own built-in file server software. A minimum of 10k of memory is needed for buffering by the interface. This will only affect unexpanded QLs, which will find themselves a bit short of working space - but they will be able to network!

Access time on Fast Network is 20 Kbytes a second - faster than access to a 720K disk drive (typically 15 KB/sec).

Says Ron Dunnett, who has designed the hardware: "In real time executing Psion Xchange on out network took 8 seconds. On the normal network it takes 76 seconds!" The bonus is that it will also work with the QL emulator on Atari STs, to network QL to ST or ST to ST. All the software, which has been written by Phil Borman, is on rom in the interface, including the file server. Only just off the bench as we write, the prototype Fast Network was demonstrated for the first time at the Quanta Workshop at Rayne on September 19. See it again at the Workshop in Bristol on October 17th. (Walton Park Hotel, Wellington Terrace, Cleveland, Bristol.) Qubbesoft are now ready to go ahead and layout the pcb and cost up the parts. "It'll take about six weeks," says Ron, "So we should have it ready for Christmas." The boards will be on sale (naturally) in pairs - unless anybody wants to try networking a single QL! The price will be around £120 for a set of two interfaces, but this has still to be finalised.

Qubbesoft is still selling Trump Cards to a steady demand. The TC now costs £95 with a years' guarantee and an A4 manual.

Another project in the pipeline is an IDE hard disk interface to take advantage of cheap second-hand 40MB hard disks. This is early days yet, but Ron says, "We've developed it and learned what the problems are. Now we're looking at the problems! It's looking good but we won't know for a little while yet."

Contact Qubbesoft at 38 Brunwin Road, Rayne, Braintree, Essex CM7 5BU. Tel. 0376

QLScene

New Home for Mersey Mugs

The **Mersey QL User Group** (QLMUG) are meeting at a new venue following the sad death of their founder Don James. The new meeting place is the Wirral All-Format Computer Club, St. Lawrence's Parish Church, Claughton Road, Birkenhead (near the Pyramide shopping centre), Liverpool. Meetings will continue at the usual time: alternate Mondays at 7.30 pm. New members and anyone wanting to know when the next meeting is can phone **Mr. G Reynolds on 051 932 1484 in the evenings.**

DILWYN JONES ON FAX

Customers please note! Dilwyn Jones is now on **FAX**. The number is the same as for Dilwyn's voice line - **0248 354023** - , but if fax users hit **START** on their fax machines, the line will switch and deliver the data to Dilwyn's printout. The answering machine is still there for those who like it!

Rewrite Shakespeare with SJPD!!

This month's new disks from SJPD Software are SJPD 32 and 33 (assorted programs), SJS64 (Adventure 93, a collection of adventure games, some of them well-known, from the Scottish QL Users Club), SJS65 (the Salvador Merino Shareware disk) and SJS66 (Gzip V1.07). There are also some updates of interest: Spectator Spectrum emulator has now been updated for 128K Spectrums, along with 48K emulation. QL Hard Disk is now up to version 2.50, and QL-REXX now includes the source code.

Have you ever felt that your favourite author made just a teeny error of judgment on page 159 of the Collected Works? Or perhaps it was a only a typo! Either way, here is your opportunity to rewrite Shakespeare and all those other famous authors. Steve Johnson has been busy converting no fewer than twenty disks of classic literature over the QL. As well as Shakespeare, he has Homer, Mark Twain, and Lewis Carroll. Each disk has a self-loading boot program and QED text editor.

SJPD do a disk-based catalogue including some free programs. Just send a formatted disk, return postage and an address label. There is also a printed catalogue for four first-class stamps. Contact SJPD, 36 Eldwick Street, Burnley, Lancs BB10 3DZ.

Crowds in Bristol Now

Don't forget the **Bristol Quanta Workshop**, from 9 am on Sunday 17 October at the Walton Park Hotel, Clevedon, Nr. Bristol. Traders expected include TF Services, Qubbesoft, Dilwyn Jones, Miracle Systems, QBits, Adman Services, Ocean Computing (Professional Poolster), W N Richardson and possibly Jochen Merz. There will be a talk on SuperBasic by John Miller and one on machine code programming by Alan Miller. The workshop will be on the Pointer Interface, led by Geraint Jones and Phil Jones. **Call Mike Ashford on 0272 629981** for more information.

QVME

The future now? Wolfgang Lernerz uses the QL emulator for the Atari STe.

INFORMATION

Prices: QVME card: DM 695

Adapter: DM 90

Supplier: Jochen Merz Software, Im stillen Winkel 12, D-4100 DUISBURG 11 Germany

For some time, the Atari emulators were the best and only way to get a better, faster and more reliable QL: buy an Atari, install an emulator card (which involved some brandishing of the soldering iron), and the Atari behaves like a QL. As the Atari had a true 68000 (instead of the QL's 68008) it was noticeably faster than the QL, especially in printing to the screen, as it is not hampered by the QL's double access to the screen memory. A Mega ST with 4 MB memory and a hard disk makes a formidable QL!

When Atari brought out the STe (which is faster than the older ST series, being a 16 MHz machine), everybody waited for Jochen Merz to come up with an emulator for that machine - the old emulators would not work with it. That new emulator is finally here. It was very long in coming, and I suppose that Merz lost a few sales to the Gold Card by then (he says he didn't). It is called the **QVME** card, because it plugs into the "VME bus" of an **Atari Mega STe**.

On The Card

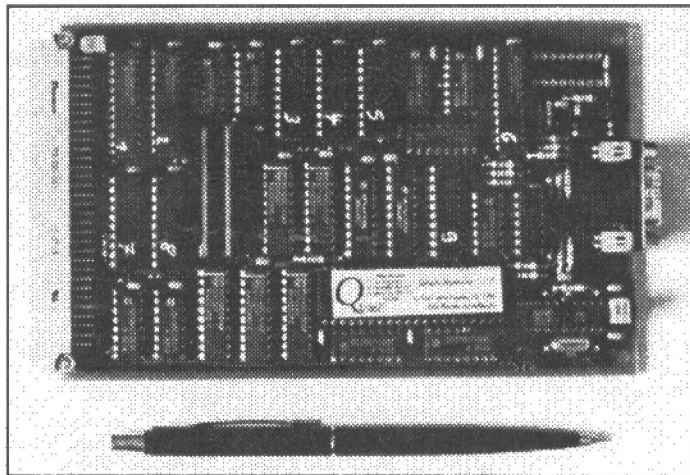
There is not much to say on the physical description of the QVME card. As you

can see from **figure one**, it is neatly finished, with a VME connector at one end. I confess that I was astonished by the number of chips on it - the board is densely populated, even though it uses high integration. It is a very professional product, there is no evidence of last minute tampering, or wires running where they shouldn't.

Nice as the card may be, were it just another emulator, only adapted to the STe series, it would hardly be important enough to merit a review in QL World. There is more to it, however.

First of all, installation is very much simplified: The card simply plugs into the STe's VME bus. No soldering is required. The QVME card can only be used in Mega STes, as the 1024 STe does not have a VME bus. Given the country of origin, this apparent restriction of choice is not surprising: In Germany, the majority of Atari machines sold were Mega ST(e) machines. There, the Atari was more seen as a (small) business machine, whereas in Britain it never really got over the games machine image.

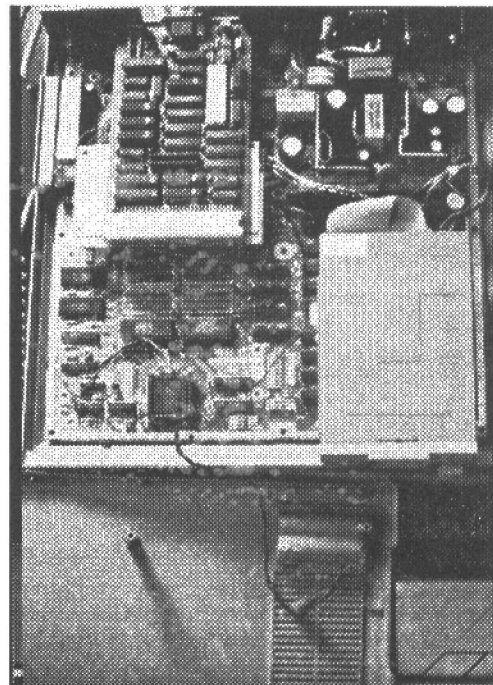
It should be emphasised that Jochen Merz also sells a Mega ST adaptor, so that those having an older Mega ST can also use the QVME card (one wire needs to be soldered in that case). This is the case for me: I have a Mega 4 ST, and with the use of the adaptor, I can use the QVME card. This is the configuration actually used to write this review. **Figure two** shows the card comfortably installed inside the machine.



Above: The QVME Card: High quality construction. Below: The QVME Card fits nicely into the Atari STe.

Large Screen

Once installed, the card must be connected directly to the monitor. Indeed, the QVME card is actually a fully-fledged graphics card for the STe which replaces the latter's internal circuitry. (Drivers to use it in Atari native mode are also provided, but this does not work on ST machines, one needs a genuine STe.) The reason for such a graphics card is that it can display resolutions much higher than the Atari can: resolutions up to 1024x768 are possible - even in QL mode: more than four times the native QL screen!



Of course, one will need a suitable monitor, a multisync being the best. Monitor size is also important. A 14 inch monitor can't really go much higher than the 832x416 resolution in figure three, or the letters are too small for comfort. With a 17-in monitor, that should be possible, though. A normal QL moni-

When programming, those using QD are also happy, as the window of that editor can be enlarged, so that one can see many more lines at a single glance.

So what is using the card like? First of all, having a high resolution QL (after all, that is what it boils down to) is addictive! At last there is enough space for a whole row of buttons at the top of the screen (see **figure three**), visually recalling the jobs running in my machine. It also becomes realistic to leave many window open, as somewhere part of it will show and thus can be 'picked' quickly with the mouse. With a large screen, multitasking gathers a new dimension. This enables me to integrate the computer even more into my business life. I have written a suite of programs to assist me in (or automate) most material aspects of my law office (mainly follow-up of cases, accounting, standard letters etc). Now the AtaQL reflects even more closely the way I work, compelled (through telephone calls, urgencies etc..) to switch quickly from one task to another. In that sense, I can certainly say that the larger screen is - for me - a productivity tool.

Several Things

In addition to the possibility of seeing several things at once, it also becomes possible to see more (of a list, a letter, a deed etc) at once. This, again, speeds up my work - nothing can beat the human eye/brain combination to pick up fast salient facts from a screenfull of lines. Unfortunately, however, this latest possibility is still restricted: not all programs can make use of the large screen; only a few do. They run, but they still assume the the maximum screen size is 512x256. Some programs (such as the QPAC 2 suite, QD, Qspread and so on) allow their screen size to be altered and of course,

these programs can take advantage of the large screen. With one exception, they invariably run under the pointer environment. The exception is Text87 - it will adjust to a larger screen, even though it is not a pointer environment product. For various reasons, I don't use Text87, and my biggest lament is that I don't have a wordprocessor showing me more of a page!

One aspect of interest might be the screen updating. We all know by now that, in the QL, screen access is rather slow. On the Atari, this is not the case, so, compared to the QL, scrolling a page up or down in blindingly fast. With a larger screen, however, scrolling speed goes down again. This is easily explained. Suppose one scrolls the screen down by one pixel line. This means that the entire screen must be moved down one line. At a normal QL resolution of 512x256 pixels in 4 colours, the processor must thus move $512 \times 256 / 4$ bytes (there are 4 pixels to a byte in 4 colour mode) = 32768 bytes. When using (say) a 1024x512 resolution with the card, the processor must move $1024 \times 512 / 4$ bytes = 131072 bytes, i.e. four times as much a normal QL! Despite that, scrolling on an AtaQL is still fast - as fast as a normal QL!

Of course, there are some other niggles. To my mind, they are minor, but I know of others who do feel inconvenienced. Perhaps the most lamented is that the emulator only allows Mode4. There is no Mode8 at all. I may be wrong, but to my knowledge, the only programs using Mode8 are graphics programs, or games. I only rarely use the former - and the games I play work in Mode4. As I never use Mode8, I can honestly say that I don't miss its absence at all.

Compatibility

Also, there are some compatibility problems: no program writing direct to the screen will work - the screen address does not lie at \$20000 as in the QL. It seems to be somewhere in high memory. But there again, the majority of programs writing direct to the screen are games... It must also be mentioned that some programs, even though they write directly to the screen, can be persuaded to run nevertheless: such as the Psion suite, all of which (except Easel, for obvious reasons) can run on the emulator. Indeed, in figure three, you can see Quill, being used to type this review (actually, I cheated, because the is the Quill of Turbo-Xchange, which can also be persuaded to run on the emulator).

Another potential source of trouble could be the pointer environment, which is automatically loaded into the machine. I personally think that the pointer environment is the best thing to have happened to the QL since its inception. I would actually refuse to work with a machine that didn't have it loaded, but there are some people who can't get to grips with it.

I also have an unfulfilled wish. It is clear that the card can only display four colours. It would have been very nice, however, if I could choose what these colours were! The reason for that? Well, it would be nice to be able to replace the colour green (or red) by a grey. This would not make much difference to already existing programs, but I could then use white, black and grey to achieve some neat 3D effects in programs I write myself! Unfortunately, the colours are hard-coded in the QVME card, so that is not possible.

All in all, though, these criticisms are minor. For me, the situation is simple: there is

no program available on the QL which I would like to use, but which I can't use because of incompatibility problems. The emulator is in my machine to stay!

Future?

The card addresses the point I perceive to be the biggest disadvantage of the QL: the screen. Indeed, if one looks at other computers today, what most QL users find striking, is their display. Most software developed today for, notably, PCs using Windows, just looks nice. Never mind, here, whether that software works (much of it doesn't!) or does things you couldn't do with the QL (as is often, and very wrongly, stated) - the fact is that it is often pleasant to look at, heightening the interest in the program (and the computer). I firmly believe that it no longer is enough for a modern program to do what it sets out to do - it must also do it in a visually pleasing manner. This is difficult to achieve on a normal QL display! It is incredible that a modern computer (and, even after 10 years, the QL is still that!) should only have a highest resolution of 512x256 in 4 colours. The QVME card certainly puts that right!

Moreover, due to a unified interface system, modern software on other (lesser!) computers is also often more easy to use - but if every QL developer could only be made to develop under the pointer environment, the QL could also have that!

The debate over the future of the QL has been going on for some time now, and it is no accident that the QXL card should be out soon. For those QL users having Mega ST(e) computers, the QVME card could be the best way to have that future, now.

DIY TOOLKIT

Eek! DIY Mice!

Simon Goodwin trumpets the arrival of a versatile mouse driver for any Qdos system.

Mice are pointing devices, invented in the early 1970s at Xerox PARC (Palo Alto Research Centre). Mice are used to move a pointer onto symbols on a computer screen, and became fashionable soon after the launch of the QL, mainly because of the success of Apple's Macintosh computer.

The QL already supports joysticks, function and cursor keys, but sometimes only a mouse will do. Since 1984 there have been many attempts to graft mouse support onto Qdos, but only now is it practical to take a DIY approach.

Unlike digital joysticks and keys, mice return signals that are proportional and scalable, so the movement on screen corresponds to the movement of the mouse, according to an adjustable scale. Unlike light-pens, where you hold a pen to the screen, you don't wear your arm out using a mouse. The only really promising rival for the mouse is the pen, but these usually require a special pad.

This DIY project lets you use mice developed for IBM-compatible computers with your QL. It explains the different types of mouse available, and potential pitfalls in the system software. You can buy alternative input devices that send the same signals as a PC mouse, so my programs also work with track-balls, bitpads and other gadgets made for PCs.

To Point or Not?

Back in Qdos, we all know that Qpac-2 needs a pointer, but programs for the pointer environment remain a minority of QL releases. In fact most other programs have implicit pointers, like the cursors in Abacus, Quill, text and document editors, highlights on forms like the Turbo front end or DiscOver menus, and many other variants.

The DIY Toolkit mouse driver will work with all these cursor-controlled QL utilities, as well as with programs specifically written for a Pointer environment. It's just as useful with Quill or Qlipboard as it is with QRAM or Qpac.

QL Mice

Mouse interfaces have been a prolific area of QL experimentation over the years. The basic mouse electronics produce four trains of pulses, but the QL hardware cannot read these directly. Only recently has it become possible to plug a mouse straight into Sinclair's ports. The Eidersoft mouse interface connected to the rom port. It worked with specially-written software, limiting its appeal. ABC Elektronik's Giga Mouse used simple ST mouse with a baroque adapter that plugged into Ctrl1 and the microdrive expansion port. A small black box converted mouse pulses into joystick taps for the Ctrl port.

Sandy built a mouse inter-

face into some models of their SuperQboard expansion unit. This did not interface directly with the keyboard or Sinclair SuperBasic, but could be read by Qram. QIMI is a tiny interface that works with SuperBasic and Qpac, translating and routing mouse signals straight to the guts of the QL. There were problems fitting it into the space inside some QLs, but it's a neat solution once you have it installed. Quanta's Mersey mouse emulates the keys, connecting to both Ctrl ports and the microdrive expansion connector.

All these attempts have one weakness in common. They are expensive, because they use a special interface to link a simple mouse to unsuspecting QL ports. Recently, with the arrival of Microsoft Windows 3, PC owners have woken up to the need for mice. This has brought new breeds of mice onto the market, and new potential for QL owners with the right software.

Jochen Merz's serial mouse opened up this market, but prices remained high and some users ran into compatibility problems. After discussions at my local Quanta group, I de-coded the output of both common models, without recourse to 'standard' PC documentation, and the DIY Toolkit mouse drivers were born.

Serial Mice

The original IBM PCs had no mouse port, but every one had at least one serial

port, so it made sense to try to link a mouse there. The millions of potential PC purchasers made it cost-effective to develop a custom chip that would fit inside the mouse, sorting and counting pulses, periodically spitting out totals and button settings as packets of serial data.

PC serial mice are much more complicated than their Amiga, Mac and ST bretheren, but the extra silicon is small and cheap so they now cost no more than the ones that send simple pulses, which need more wires in any case.

The difference in performance is barely noticeable unless you move the mouse extremely quickly, when pulsed interfaces are a little more likely to keep up. Some PC models have adjustable resolution to counter this.

There are several sorts of serial mouse for IBM-compatible machines. This project works with old-style three-button 'Mouse Systems PC serial' mice and the more recent 'Microsoft Serial' type. Avoid bus-mice, which are meant to connect directly to the dedicated mouse port on recent PC clones, rather than a serial port. The safest best is a Microsoft serial mouse, but then you only get two buttons.

Both send data at 1200 baud - 30 or 40 messages per second, at most but the Mouse Systems type can indicate more movement with a single message. I tested these programs with

an AXELEN dual-standard switchable mouse, bought for a tanner at an All-Formats Computer Fair. The middle button is ignored when it is switched to Microsoft mode.

Connectors

Serial mice are widely available at this sort of price, and come with a nine or 15 pin PC connector. If you have a British-made QL you need to replace this with a six-pin plug to suit your SER port. Samsung QLs have a nine-pin connector which may accept the PC plug, but you'll still need to check that the internal connections match your chosen QL port. Only four connections are needed. This explanation assumes you're wiring a six-pin QL plug for SER2 in place of a nine-pin D-type

supplied with the PC mouse. Join QL pin 6, the power connection, to pin 8 on the D-type. QL pins 4 and 5 are unused. Link QL pin 3 to mouse pin 2. QL pin 2 goes to mouse pin 3, and QL pin 1 makes the ground connection to mouse pin 2.

Dennis Briggs of Adman Services can build you an adapter for a few pounds if you do not feel like making up your own. He can also supply PC mice with the QL plug already fitted. Dennis is a staunch advocate of the dictum that a picture is worth a thousand words, and published a useful set of diagrams in May's Quanta and West Midlands QL group newsletters, showing various connections for QL, Thor and PC monitor, disk, serial, Ctrl and mouse ports.

Serial ports

I propose to develop a mouse driver for all QLs and compatible systems, but I have started simply, with SuperBasic programs to read the standard PC and MS mouse signals. Like the DRAW and CLIP\$ extensions, in past columns, I have derived my code from prototypes built from toolkit extensions and standard commands, which can easily be edited, interpreted or compiled.

It's valuable to be able to experiment in SuperBasic, especially when the input format must be found by trial and error, but standard QLs are handicapped by the poor performance of Sinclair's SER input code.

These prototype routines were specifically written for

computers with the Hermes and Minerva upgrades, from Tony Firshman. You are unlikely to be able to read messages from a serial mouse reliably from SuperBasic on a QL with Sinclair roms and the original 8049 coprocessor, because the mouse does not wait if the receiving computer is busy, and Sinclair's serial input routines are slow and tend to lose characters unless the input device is willing to wait or they are polled at machine-code speed.

Hermes

The Hermes IPC contains much more efficient input routines, written by

Laurence Reeves, and these make serial input far more reliable. The Minerva rom corrects other bugs in Sinclair's serial handler, so the combination is strongly recommended if you intend to use the QL serial ports from SuperBasic for more than just driving a printer.

These tests were performed on a 640K QL with Hermes and Minerva 1.93, and repeated with a two-megabyte Gold Card fitted in place of CST's eight-bit memory and disk interface. Both Sinclair and Grundy power-supplies were used.

The mouse takes very little power, and did NOT interfere with the serial-to-parallel converter fitted on port 1, as long as I remembered to reset the baud rate to 9600 before printing. The Hermes Toolkit includes the command `PRINT RXBAUD%(196)` which selects 1200 baud for SER2 input only.

PC books are full of library-calls to the system, but lack details of the hardware protocol, so I have worked out the data format by experiment. I welcome comments; it is likely that there's more going on than my programs detect, but they do the job.

Example Programs

The mouse signals are decoded by the three SuperBasic listings alongside this text. Listing One lets a Microsoft serial mouse move a small block around a window, until both mouse buttons are pressed.

The block is plotted with pixel co-ordinates, two pixels high and wide in Mode4, so there's a risk that it could go off the edge of the screen. In fact Minerva 1.93 clips the block to fit, with no 'out of range' error, but other roms are not so friendly.

Lines 230 and 240 use the DIY Toolkit `CHAN_W%` function to read the width and height of the window, and

QL World DIY Toolkit - Mouse driver - LISTING 1

```
100 REMark Qdos Mouse Systems pointer demo v2
110 REMark Copyright Simon N Goodwin, 14/9/93
120 REMark Tested with Hermes & Minerva
130 IMPLICIT% Mx,My,x,y,dx,dy,screen,mouse
140 :
150 BAUD 1200
160 mouse=3
170 OPEN_IN #mouse,"ser2"
180 REPEAT tidy : IF CODE(INKEY$(#3,2))=0 : EXIT tidy
190 screen=4
200 OPEN #screen,"scr_512x256a0x0"
210 CLS #screen
220 OVER #screen,-1
230 Mx=CHAN_W$(screen,28) : x=Mx DIV 2
240 My=CHAN_W$(screen,30) : y=My DIV 2
250 MTRAP 16,-1,-1 :REMARK Check display mode
260 IF DATAREG(1) && 8 : Mx=Mx-1 : My=My-1
270 BLOCK #screen,2,2,x,y,7
280 REPEAT poll
290   IF (48 && CODE(INKEY$(#mouse,-1)))=48 : EXIT poll
300   dx=CODE(INKEY$(#mouse,-1))
310   dy=CODE(INKEY$(#mouse,-1))
320   BLOCK #screen,2,2,x,y,7
330   IF dx<160
340     x=x+dx-128 : IF x>=Mx : x=Mx-1
350   ELSE
360     x=x+dx-192 : IF x<0 : x=0
370   END IF
380   IF dy<160
390     y=y+dy-128 : IF y>=My : y=My-1
400   ELSE
410     y=y+dy-192 : IF y<0 : y=0
420   END IF
430   BLOCK #screen,2,2,x,y,7
440 END REPEAT poll
450 CLOSE #screen
460 CLOSE #3
470 STOP
```

QL World DIY Toolkit - Mouse driver - LISTING 2

```

100 REMark PC/QL Mouse exerciser, SNG v1.1
110 REMark Use Dennis Briggs' SER2 adapter
120 REMark and an AXELEN mouse set to PC.
130 :
140 REMark Directives for TURBO
150 DATA AREA 1
160 IMPLICIT% k,k2,d,oldk
170 :
180 debug= "0 *==DEBUG FLAG [0 or 1] Controls #0 messages"
190 xscale="10 *== X sensitivity, 1 is MAX, 50 is MIN"
200 yscale="10 *== Y sensitivity, 1 to 50"
210 :
220 BAUD "1200 *== Baud rate - usually 1200"
230 OPEN #3,"ser2" : WHEELS : CLOSE #3 : STOP
240 :
250 DEFine PROCedure BUTTONS
260 down=(oldk<7) : oldk=k
270 IF down OR k<>7
280 AT 1,56 : CLS 4
290 SElect ON k
300 =0 : PRINT "Buttons 1, 2 & 3"
310 =1 : PRINT "Button 1 & 2"
320 =2 : PRINT "Button 1 & 3"
330 =3 : PRINT "Button 1"
340 =4 : PRINT "Button 2 & 3"
350 =5 : PRINT "Button 2"
360 =6 : PRINT "Button 3"
370 =7 : IF down : PRINT "Buttons released"
380 END SElect
390 END IF
400 END DEFine BUTTONS
410 :
420 DEFine PROCedure SPRITE
430 LINE x,y TO x+4,y TO x+2,y+4 TO x,y
440 END DEFine SPRITE
450 :
460 DEFine PROCedure WHEELS
470 CLS : INK 7 : OVER -1 : oldk=0 : x=75 : y=50
480 SPRITE
490 REPEAT poll
500 k=CODE(INKEY$(#3,-1))
510 d=k && -8
520 IF d=128 : k=k-d : BUTTONS : NEXT poll
530 IF k>127 : k=k-256
540 k2=CODE(INKEY$(#3,-1))
550 IF k2>127 : k2=k2-256
560 IF debug : PRINT #0;k,k2,
570 IF k OR k2
580 k = k / xscale
590 k2= k2 / yscale
600 SPRITE
610 x=x+k
620 IF x<0 THEN x=0
630 IF x>162 THEN x=162
640 y=y+k2
650 IF y<0 THEN y=0
660 IF y>96 THEN y=96
670 SPRITE : PAUSE 1
680 END IF
690 IF debug : PRINT #0;x,y
700 END REPEAT poll
710 END DEFine WHEELS

```

can be replaced with constant values that match the window dimensions, as long as you remember to change them if you adjust the window. Line 250 calls MTRAP from DIY Toolkit Volume T to check the display mode, and the following like subtracts one from the maxima

if Mode8 or Mode12 is in use. The serial port may be clogged with messages when the program starts, so line 180 calls for bytes repeatedly to clean out the port. Each time the mouse moves, or a button is pressed or released, three bytes are transmitted. Bits 4

and 5 of the first byte indicate the state of the buttons. The bits are set if the buttons are pressed, so line 290 leaves the main loop when both bits are set. The value 48 is $2^4 + 2^5$, corresponding to both set bits. The && operator ensures that the other bits are ignored.

The next two bytes contain five-bit counts for horizontal and vertical movements, with the direction indicated by a sixth bit. The most-significant bit of these bytes is normally set, so values 129 to 159 indicate increasing movements in the positive direction, and 191 down to 160 signal movement the other way.

Mouse Systems

Listing Two is similar but suits a three-button Mouse Systems rodent. It decodes all three buttons, printing messages to indicate the current combination pressed, and moves a triangular graphical symbol around the screen under mouse control.

The variables XSCALE and YSCALE determine the number of pulses the mouse must send before the pointer moves one unit. If the variable DEBUG is 'true' (non-zero) the graphics co-ordinates of the pointer are displayed as it moves. These values are expressed as strings so they can still be changed after the program is compiled.

There is no requirement to check for the edge of the window as graphics can be plotted over the boundary, but you may wish to adjust the limits in lines 620 to 660 if you alter the graphics SCALE.

The Mouse Systems protocol also uses three bytes per message, but the buttons are encoded in the three least significant bits of the first byte, and the position changes are eight bit signed bytes, allowing larger moves to be encoded in a single message. The limit for each message is +127 or -128 in any dimension.

Mouse Driver

Listing Three is the most useful, implementing a complete mouse driver that

QL World DIY Toolkit - Mouse driver - LISTING 3

```

100 REMark QL Mouse Key emulator SNG v 1.01
110 REMark Tested with Hermes, Minerva 1.93
120 REMark and a Microsoft serial PC mouse,
130 REMark via Dennis Briggs' SER2 adapter.
140 :
150 REMark Directives for TURBO
160 DATA AREA 1
170 IMPLICIT% k,k2,d
180 :
190 xscale="05 * = X sensitivity, 1 is MAX, 50 is MIN"
200 yscale="05 * = Y sensitivity, 1 to 50"
210 :
220 BAUD "1200 * = Baud rate - usually 1200"
230 OPEN #3,"ser2"
240 WHEELS
250 CLOSE #3
260 :
270 DEFine PROCedure BUTTONS
280 SElect ON k
290   =3 : ENTER " "
300   =5 : ENTER CHR$(27)
310   =6 : ENTER CHR$(10)
320 END SElect
330 END DEFine BUTTONS
340 :
350 DEFine PROCedure WHEELS
360 CLS : INK 7 : OVER -1 : oldk=0 : x=3 : y=8
370 REPeat poll
380   k=CODE(INKEY$(#3,-1))
390   d=k && -8
400   IF d=128 : k=k-d : BUTTONS : NEXT poll
410   IF k>127 : k=k-256
420   k2=CODE(INKEY$(#3,-1))
430   IF k2>127 : k2=k2-256
440   IF k OR k2
450     k = k / xscale
460     k2= k2 / yscale
470     x=x+k
480     IF x<0 THEN x=3 : ENTER CHR$(192)
490     IF x>6 THEN x=3 : ENTER CHR$(200)
500     y=y+k2
510     IF y<0 THEN y=8 : ENTER CHR$(216)
520     IF y>16 THEN y=8 : ENTER CHR$(208)
530   END IF
540 END REPeat poll
550 END DEFine WHEELS
560 :
570 DEFine PROCedure ENTER(t$)
580 t=QUEUE%(t$) : IF t : BEEP 500,CODE(t$)
590 END DEFine ENTER

```

works with all QL software normally controlled with cursor keys, like Xchange, The Editor, ED and most other titles. Once compiled this program translates mouse moves into key-presses according to the scale set;

you may like to adjust the values to match your character-size if you use Mode4 or Mode8 exclusively. The three buttons generate the Space, Esc and Enter key-presses expected by Qpac and most other front-

end systems. Line 580 uses the QUEUE% extension from DIY Toolkit volume Q to put a character into the current task's key-buffer. If there is no room in the buffer a BEEP sounds. This is unlikely unless you move

the mouse a lot while the program is busy and not reading the keys. If the QL chirps, wait! Turbo users could use the Toolkit extension TYPE_IN instead of PROC ENTER, but hence they would lose the audible indication that characters are getting lost.

The programs work fine from SuperBasic, although cursor movement may trail after the mouse if the Basic lags behind the stream of data. This is most obvious when the mouse is moved quickly on a slow 68008-based machine. The programs have no trouble keeping up once they are Turbo-compiled.

The IMPLICIT% directives at the start of the programs advise Turbo to save time and memory by treating certain variables as integers. DATA AREA 1 tells the compiler to allocate minimal dataspace for the task. The lines are only needed if you have Turbo Toolkit loaded and intend to compile the programs.

The programs suit all QL-compatible systems with proper serial port hardware, like the Thor XVI, Amiga and Atari ST, but the latter emulators already support a built-in mouse port. If you have QCONNECT you might like to try using its fully-specified serial port as a buffer between the QL and your mouse, as it was designed in conjunction with Sinclair to fix many of the faults of the QL SER ports.

Next Month

Now that I've shown how mouse messages can be decoded, it's time to cook up machine-code to read them up efficiently before Sinclair can chuck them away! My next column will include a complete mouse driver in machine-code, with assembly source. You have a month to get hold of a serial mouse, and a plug or adapter for your computer.

During the Second World War in 1939-45, the German armed forces used a coding machine called Enigma for the transmission of operational messages. British Cryptanalysts working at Bletchley Park under the operational code-name of ULTRA continually deciphered these codes and the resulting information was of immense value to the successful prosecution of the war. This program has nothing to do with Cryptanalysis! It seeks only to simulate the action of the Enigma machine in coding messages and in decoding them on receipt. To understand the objectives of the program it is necessary (a) to understand how the Enigma machine

Code: Enigma!

George Phelps introduces the Enigma coding machine on the QL

```

15 GO TO 100
20 DEFine PROCedure initialize
30   DIM i(26,10):DIM j(26,2)
40   FOR n=1 TO 26
50     READ i(n,1),i(n,2),i(n,3),i(n,4),i(n,5)
60     READ i(n,6),i(n,7),i(n,8),i(n,9),i(n,10)
70     READ j(n,1),j(n,2)
80   END FOR n
90   RESTORE :CLS
95 END DEFine
100 CLS:PRINT 'Coding Using Enigma'
110 PRINT:PRINT

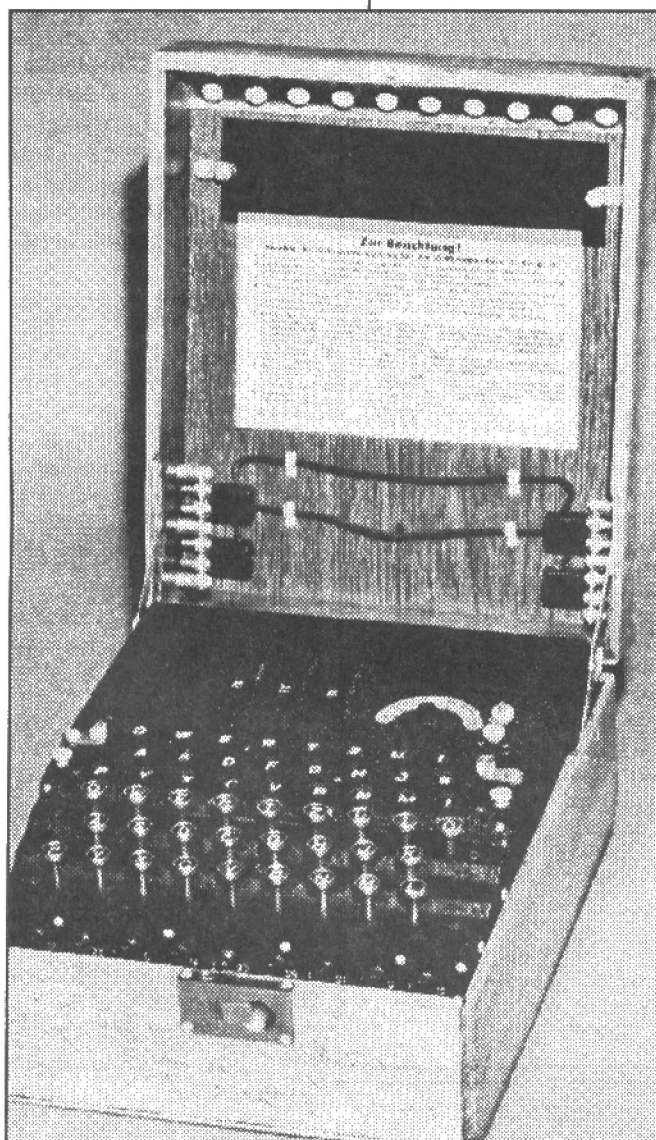
```

120 PRINT 'The ENIGMA Operator has a Code-book which tells him the Wheel selection, the Ring setting and the Steckerboard setting for each day. You must therefore invent these for yourself as 3 numbers from 1 to 9 (all different) for the Wheels, 3 letters for the Rings and 2 sets of 11 letters (all different) for the Steckerboard. You will also need to invent 2 3-letter codes (as did the Operator) for the Code Indicator Setting and the Main Code Setting. Press any key when you are ready.'

```

130 a$=INKEY$(-1)
140 CLS:PRINT "Coding using Enigma":PRINT
150 PRINT '1.Initialize\'2.Daily Key Setting-Sending\'
160 PRINT '3.Sending Station Coding\'4.Receiver Decoding\'5.Daily Key Setting-Receiving\'6.Close Down\'7.Reset for Sending\'8.Reset for Receiving'
160 INPUT 'Enter Activity Required';a
170 SELECT ON a
180   ON a=1
190     initialize:REMark 20
200   ON a=2
210     keyset_send:REMark 370
220   ON a=3
230     main_coding_send:REMark 1650
240   ON a=4
250     main_decoding_receive:REMark 640
260   ON a=5
270     keyset_receive:REMark 500
280   ON a=6
290     STOP
300   ON a=7
310     reset_send:REMark 920
320   ON a=8
330     reset_receive:REMark 990
340 END SELECT
350 CLS
360 GO TO 150
370 DEFine PROCedure keyset_send
380   CLS:PRINT 'The Daily Key must be set by'
390   PRINT 'the Operator as instructed'
400   INPUT 'Wheel Sequence?';q$
410   PRINT 'The Wheel Sequence today is';q$
420   set_wheels 1,2:REMark 1070
430   INPUT 'Ring Setting?';r$
440   PRINT 'The ring Setting today is';r$
450   set_rings 2:REMark 1170
460   PRINT 'Obtain Steckerboard Settings'
470   PRINT 'for today from Codebook'
480   stecker:REMark 1480
490 END DEFine

```



```

500 DEFine PROCedure keyset_receive
510   CLS:PRINT 'The Daily Key must be set by'
520   PRINT 'the Operator as instructed'
530   INPUT 'Wheel Sequence?';q$
540   PRINT 'The Wheel Sequence today is ';q$
550   set_wheels 2,1:REMark 1070
560   INPUT 'Ring Setting?';r$
570   PRINT 'The Ring Setting today is ';r$
580   set_rings 1:REMark 1170
590   sorting_wheels:REMark 2670
600   PRINT 'Obtain Steckerboard Settings from'
610   PRINT 'the Code Book for today'
620   stecker:REMark 1480
630 END DEFine
640 DEFine PROCedure main_decoding_receive
650   CLS:PRINT 'The Uncoded Preamble provides the S
ender Call-sign,the Receiver Call- sign,the Time of Or
igin,Single or Multi-part messages,the no.of letters
in the text and the Code Indicator Setting'
660   INPUT 'Enter Message';x$
670   LET w=LEN(x$)
680   PRINT 'Message Length ';w;' chars,'
690   INPUT 'Enter Indicator Setting';c$
700   PRINT 'Setting Wheels to ';c$
710   code_indicator c$:REMark 1990
720   LET p=1
730   DIM z$(6)
740   FOR m=1 TO 6
750     LET a$=x$(m)
760     decoding:REMark 2820
770   END FOR m
780   CLS:PRINT z$(1 TO 6):PAUSE 200
790   PRINT 'Reset Wheels to Main Code'
800   INPUT 'New Code?';e$
810   code_indicator e$:REMark 1990
820   LET p=7
830   DIM z$(w+6)
840   FOR m=1 TO w+6
850     LET a$=x$(p)
860     decoding:REMark 2820
870   END FOR m
880   PAUSE 200
890   PRINT 'Message Decoded'
900   display_print:REMark 2480
910 END DEFine
920 DEFine PROCedure reset_send
930   CLS:PRINT 'Reset Machine for Sending'
940   set_wheels 1,2:REMark 1070
950   set_rings 2:REMark 1170
960   PRINT 'Reset for Sending!'
970   PAUSE 200
980 END DEFine reset_send
990 DEFine PROCedure reset_receive
1000  CLS:PRINT 'Reset Machine for Receiving'
1010  set_wheels 2,1:REMark 1070
1020  set_rings 1:REMark 1170
1030  sorting_wheels:REMark 2670
1040  PRINT 'Reset for Receiving!'
1050  PAUSE 200
1060 END DEFine reset_receive
1070 DEFine PROCedure set_wheels (aside,bside)
1080  DIM d(26,2):DIM e(26,2):DIM f(26,2):DIM g(26,2)
1090  LET q=q$(1):LET r=q$(2):LET s=q$(3)
1100  FOR n=1 TO 26
1110    LET d(n,aside)=n:LET d(n,bside)=i(n,q)

```

worked and (b) to understand the operational procedures surrounding the machine. It will be glaringly obvious that there were many ways in which the Germans could have improved the system and thus made it more difficult to crack. They didn't - and so this program only attempts to simulate what they actually did!

Procedures

It is best to start with this aspect of the problem. First, remember that Enigma is only a coding/decoding machine; it does not transmit messages. In fact, it doesn't even print out the coded (or decoded) messages, though one can't really see why not. Second, every unit equipped with an Enigma machine also has a code-book containing instructions on the set-up of the machine which are valid for 24 hours only changing at midnight each day. The operator is responsible for changing the set-up appropriately before sending messages.

A message is assembled as follows: Certain information will be sent "in clear" (uncoded). This includes sender and receiver callsigns; time of origin; length of message; single or multi-part; and a code known as the Discriminant, which identifies the type of traffic and confirms the daily keys used in the set-up. We do not need to concern ourselves with this, but we do need to consider the code indicator setting also sent "in clear". This is the first of the code keys which we shall use. It is a three-letter code, chosen by the operator, and as explained is transmitted in clear. This code is used to set the machine for the first six letters only of the message and these let-

ters are used to transmit the main code key for the message (also a three-letter code chosen by the operator and transmitted twice). Thereafter the machine is re-set to this main code key and the bulk of the message is transmitted. The word "transmit" is used loosely here as the coded message is simply written down from the machine and given to the radio operator who actually transmits in the usual five-letter groups. At the receiving end, the message is received over the radio and then delivered to the Enigma operator. His machine is already set up as directed by his code-book. You will recall that the message arrives with the first section in clear, carrying the code indicator setting which is used by the receiver to decode the first six letters. These reveal the main code key for the message (a three-letter code repeated twice). The operator then re-sets his machine to this code key and can then decode the remainder of the message.

Description

The Enigma machine looks roughly like a typewriter without the printing mechanism. Instead it has a complete set of lamps corresponding to the keys. On depressing a key, a lamp lights up (but of course, a different lamp!) and it is the transcription of these lamps which constitutes the coded message. This operation is carried out by a simple flow of current through the various parts of the machine from key to lamp. However, the flow is not simple at all, but very complex and it is this flow that we have to try to follow. The key connects first to a device which is called the Steckerboard,

```

1120 LET e(n,aside)=n:LET e(n,bside)=i(n,r)
1130 LET f(n,aside)=n:LET f(n,bside)=i(n,s)
1140 LET g(n,aside)=n:LET g(n,bside)=j(n,aside)
1150 END FOR n
1160 END DEFine
1170 DEFine PROCedure set_rings (side)
1180 PRINT 'Entering Wheel Start Positions'
1190 LET z=1:y=1:x=1
1200 LET a$=r$(1)
1210 LET zz=CODE (a$)-96
1220 LET a$=r$(2)
1230 LET yy=CODE (a$)-96
1240 LET a$=r$(3)
1250 LET xx=CODE (a$)-96
1260 rotating zz,z,d,side
1270 IF mm THEN LET yy=yy+1:mm=0:z=1
1280 rotating yy,y,e,side
1290 IF mm THEN LET xx=xx+1:mm=0:y=1
1300 rotating xx,x,f,side
1310 IF mm THEN LET mm=0:x=1
1320 END DEFine
1330 DEFine PROCedure rotating (wheel,count,posn,side)
1340 LET mm=0
1350 FOR m=1 TO wheel
1360 rotate_wheel count,posn,side
1370 IF count>26 THEN LET mm=1
1380 END FOR m
1390 END DEFine
1400 DEFine PROCedure rotate_wheel (count,posn,side)
1410 LET a=posn(1,side)
1420 FOR n=1 TO 25
1430 LET posn(n,side)=posn(n+1,side)
1440 END FOR n
1450 LET posn(26,side)=a
1460 LET count=count+1
1470 END DEFine
1480 DEFine PROCedure stecker
1490 PRINT "Enter Steckerboard Settings. Two setsof 1
1 letters(all different). "
1500 DIM h(26,2)
1510 INPUT '1st Set of letters(all different)';a$
1520 IF LEN(a$)<>11 THEN PRINT 'Error':GO TO 1510
1530 INPUT '2nd Set of letters(all different and also
different from the 1st Set)';b$
1540 IF LEN(b$)<>11 THEN PRINT 'Error':GO TO 1530
1550 FOR n=1 TO 11
1560 c$=a$(n):LET a=CODE (c$)-96
1570 c$=b$(n):LET b=CODE (c$)-96
1580 LET h(a,2)=b:LET h(b,2)=a
1590 END FOR n
1600 FOR n=1 TO 26
1610 IF h(n,2)=0 THEN LET h(n,2)=n
1620 LET h(n,1)=n
1630 END FOR n
1640 END DEFine
1650 DEFine PROCedure main_coding_send
1660 CLS: PRINT 'The Uncoded Message Preamble would
give the Call-signs of Sender and Receiver,Time of
Origin,Single or Multi-part messages and the Code
Indicator Setting'
1670 INPUT 'Sender Callsign?';o$
1680 INPUT 'Receiver Callsign?';n$
1690 INPUT 'Type Message! Remember message must not
contain spaces,numbers,punctua- tion or capital letter
s.';x$

```

```

1700 LET w=LEN (x$)
1710 INPUT '3-letter Code Indicator Setting';c$
1720 code_indicator c$:REMark 5000
1730 CLS: PRINT 'Wheels are set to ';c$
1740 PRINT 'Choose your 3-letter Code and'
1750 PRINT 'be ready to Transmit'
1760 PRINT 'Press any key to continue'
1770 IF INKEY$='' THEN GO TO 1770
1780 INPUT 'Main Code?';e$
1790 DIM z$(w+11)
1800 LET p=1
1810 FOR m=1 TO 2
1820   FOR o=1 TO 3
1830     LET a$=e$(o)
1840     coding:REMark 5080
1850   END FOR o
1860 END FOR m
1870 PRINT z$(1 TO 6):PAUSE 200
1880 CLS:PRINT 'Wheels are set to New Code'
1890 PRINT 'and will begin Coding now'
1900 code_indicator e$
1910 FOR m=1 TO w
1920   LET a$=x$(m)
1930   coding
1940 END FOR m
1950 PAUSE 200
1960 PRINT 'Message Completed'
1970 display_print:REMark 2480
1980 END DEFine
1990 DEFine PROCEDURE code_indicator (indic)
2000 LET a$=indic(1)
2010 LET k=CODE (a$)-96
2020 LET a$=indic(2)
2030 LET kk=CODE(a$)-96
2040 LET a$=indic(3)
2050 LET kkk=CODE(a$)-96
2060 END DEFine
2070 DEFine PROCEDURE coding
2080 LET aa=CODE(a$)-96
2090 LET bb=h(aa,2)
2100 LET jj=k+bb
2110 IF jj>26 THEN LET jj=jj-26
2120 LET ccc=d(jj,2)
2130 LET jj=kk+ccc
2140 IF jj>26 THEN LET jj=jj-26
2150 LET ccd=e(jj,2)
2160 LET jj=kkk+ccd
2170 IF jj>26 THEN LET jj=jj-26
2180 LET cce=f(jj,2)
2190 LET dd=g(ccc,2)
2200 LET jj=kkk+dd
2210 IF jj>26 THEN LET jj=jj-26
2220 LET eee=f(jj,2)
2230 LET jj=kk+eee
2240 IF jj>26 THEN LET jj=jj-26
2250 LET eef=e(jj,2)
2260 LET jj=k+eef
2270 IF jj>26 THEN LET jj=jj-26
2280 LET eeg=d(jj,2)
2290 LET ff=h(eeg,2)
2300 LET z$(p)=CHR$(ff+96)
2310 PRINT z$(p);
2320 z$=z$&z$(p)
2330 LET p=p+1
2340 LET k=k+1

```

on which characters are connected in pairs so that, for example, an A pressed will produce a G output or a B pressed produce a U output and so on. For some mathematical reason, the Germans did not utilise 13 pairs but only 11, the remaining four characters being Steckerboard to themselves. From this the pulse enters the scrambler unit (described later) returning therefrom through the Steckerboard again and thence to the lamps.

Scrambler

The scrambler unit consists of three rotating wheels each of 26 cogs and connected together rather like the old mechanical calculators - that is to say that the first (or right-hand) wheel rotates every character and there is a carry-over position which causes the second (or centre) wheel to rotate one position for every 26 of the first wheel. Similarly, the carryover to the third (or left-hand) wheel is one position for every 26 of the second wheel. Each wheel has contacts on each side but they are re cross-connected within each wheel. Thus the first A position may be connected to M, but since the first wheel rotates every character, the next character arriving, if it is also an A, may connect instead to a T (for instance). The first few characters will move on to the second wheel and will pass through connections which remain unmoved until of course the carry-over position on the first wheel arrives, when they will all move on one notch. And so on with the third wheel. There is actually a fourth wheel (non-rotating) called the Umkehrwalze (or turn-around) wheel which has

a straightforward cross-connection and form the output of this the pulse goes back through the three rotating wheels in reverse order, exiting from the Scrambler to the Steckerboard. However, only one rotation movement takes place per letter. That, no doubt, seems complicated enough, but there's more! The rotating wheels are interchangeable and the operator had five to choose from (nine in this program). Part of the Daily Key read from the code book specified the sequence of wheels to be used: 5,1,3 or 4,2,1, etc.

Variwheel

Secondly, we have talked as though there is a fixed start position and that A connects first to M. This is however not so and the start of each wheel can be varied by the operator detaching a ring (for each wheel) and rotating the wheel several notches so that the starting A position connects somewhere else. This is known as the ring setting, and must also be read from the code book. From this point on, the operating procedures take over. Remember the operator first chooses a three-letter code (referred to as the code indicator setting) and re-sets each wheel according to the three letters of the code. This code is then used to transmit the main code key (another three-letter code chosen by the operator) twice, ie six letters in all. The code indicator setting is sent in clear and the receiving operator sets up his machine with that key and then decodes the first six letters revealing the main code key. he then re-sets his machine to this code and decodes the main message. Fundamentally,

```

2350 IF k>26 THEN turnover
2360 END DEFine
2370 DEFine PROCEDURE turnover
2380 LET k=k-26
2390 LET kk=kk+1
2400 IF kk>26 THEN
2410 LET kk=kk-26
2420 LET kkk=kkk+1
2430 IF kkk>26 THEN
2440 LET kkk=kkk-26
2450 END IF
2460 END IF
2470 END DEFine
2480 DEFine PROCEDURE display_print
2490 CLS:PRINT 'Do you wish to display-enter 1'
2500 PRINT 'or Printout enter 2'
2510 INPUT aaa
2520 IF aaa=1 THEN
2530 PRINT z$
2540 PRINT 'Press any key when satisfied'
2550 IF INKEY$='' THEN GO TO 2550
2560 ELSE
2565 IF aaa=2 THEN
2570 OPEN #4,ser1
2580 PRINT #4,'Sender callsign ';o$
2590 PRINT #4,'Receiver callsign ';n$
2600 PRINT #4,'Length of Message ';w;',';LEN(z$)
2610 PRINT #4,'Code Indicator Setting ';c$
2620 PRINT #4
2630 PRINT #4,z$
2640 CLOSE #4
2642 ELSE
2644 END IF
2650 END IF
2660 END DEFine
2670 DEFine PROCEDURE sorting_wheels
2680 FOR n=1 TO 26
2690 t=d(n,1)
2700 d(t,2)=n
2710 t=e(n,1)
2720 e(t,2)=n
2730 t=f(n,1)
2740 f(t,2)=n
2750 END FOR n
2760 FOR n=1 TO 26
2770 d(n,1)=d(n,2):d(n,2)=n
2780 e(n,1)=e(n,2):e(n,2)=n
2790 f(n,1)=f(n,2):f(n,2)=n
2800 END FOR n
2810 END DEFine
2820 DEFine PROCEDURE decoding
2830 aa=CODE(a$)-96
2840 bb=h(aa,2)
2850 jj=d(bb,1)
2860 jj=jj-k
2870 IF jj<1 THEN jj=jj+26
2880 ccc=jj
2890 jj=e(ccc,1)
2900 jj=jj-kk
2910 IF jj<1 THEN jj=jj+26
2920 ccd=jj
2930 jj=f(ccd,1)
2940 jj=jj-kkk
2950 IF jj<1 THEN jj=jj+26
2960 cce=jj

```


the cryptanalyst has to find three things:

1. The wheel sequence for the day.
 2. The ring setting for the day.
 3. The Steckerboard settings for the day.
- And in wartime, he had to do it every day!

Challenge

And now, the challenge: You have the machine (the program running on your QL) and you have your instructions in this article. We challenge you to decode the following message using the program and the data given, and then explain to us how you did it. We will publish the best explanations. Here are your code settings:

Sender callsign: ITV
Receiver callsign: YOU
Message length: 217
Code indicator setting: cat

Here is the message:

km idjor cejow ugpcw
quugs npwx ysgui hxxvh
tputc lkara rltso krxvv
ouscs heagg bhowc
kvqjx bjkgb beixw wgkti
fuvma wtxzl gscca xkde
jrhub baufa fstxr nqjcs
droyt nxowp xphue vkgdr
qwsjc uugur acebi bhurc
itgzh xqtsk bqksi empvm
poile htnee acejr enbcm
ftalk

You have the program, and the message duplicates certain defects which appeared in some of the original messages, which should make decoding easier. Although the program allows a choice of nine wheels, our message only uses the first five, as in the original machine.

```
2970 dd=g(cce,1)
2980 jj=f(dd,1)
2990 jj=jj-kkk
3000 IF jj<1 THEN jj=jj+26
3010 eee=jj
3020 jj=e(eee,1)
3030 jj=jj-kk
3040 IF jj<1 THEN jj=jj+26
3050 eef=jj
3060 jj=d(eef,1)
3070 jj=jj-k
3080 IF jj<1 THEN jj=jj+26
3090 eeg=jj
3100 ff=h(eeg,2)
3110 z$(p)=CHR$(ff+96)
3120 PRINT z$(p);
3130 z$=z$&z$(p)
3140 p=p+1
3150 k=k+1
3160 IF k<=26 THEN GO TO 3240
3170 k=k-26
3180 kk=kk+1
3190 IF kk<=26 THEN GO TO 3240
3200 kk=kk-26
3210 kkk=kkk+1
3220 IF kkk<=26 THEN GO TO 3240
3230 kkk=kkk-26
3240 END DEFine
3250 DATA 9,10,3,5,18,22,18,11,15,23,18,4
3260 DATA 4,15,7,23,2,19,20,16,7,2,20,11
3270 DATA 18,24,23,18,20,5,13,1,4,18,10,16
3280 DATA 25,11,15,3,10,2,17,9,21,10,1,15
3290 DATA 3,17,26,25,11,6,11,7,1,13,6,17
3300 DATA 5,14,20,26,25,23,21,18,25,19,19,5
3310 DATA 24,19,5,2,17,16,14,2,13,9,12,19
3320 DATA 20,18,10,24,26,24,24,22,16,26,24,22
3330 DATA 12,26,4,22,7,1,25,21,12,25,23,21
3340 DATA 11,16,21,19,4,17,1,8,11,4,17,3
3350 DATA 17,5,1,10,15,10,4,20,14,5,2,23
3360 DATA 22,21,18,9,19,9,22,19,20,24,25,7
3370 DATA 21,3,16,7,5,21,26,25,24,16,15,14
3380 DATA 23,7,14,11,22,26,6,14,23,15,13,26
3390 DATA 26,23,25,1,14,25,2,4,22,11,4,13
3400 DATA 7,20,2,8,13,20,10,13,26,21,3,20
3410 DATA 10,4,19,21,21,11,5,23,19,7,5,10
3420 DATA 19,1,6,20,3,3,8,12,3,1,26,1
3430 DATA 2,25,12,17,6,18,7,17,10,12,7,6
3440 DATA 16,2,11,12,24,8,16,6,18,3,16,2
3450 DATA 13,6,9,4,16,13,12,10,17,17,9,25
3460 DATA 1,12,8,15,23,12,23,26,9,14,8,24
3470 DATA 6,22,17,14,1,14,15,3,2,22,11,9
3480 DATA 8,8,24,13,12,7,3,24,8,20,22,8
3490 DATA 15,9,13,6,9,4,19,15,5,6,21,12
3500 DATA 14,13,22,16,8,15,9,5,6,8,14,18
3510 RESTORE
```

SuperBasic In Action

Simon Goodwin brings his file requester to life scrolling and selecting names.

Last issue I introduced a flexible file requester, written in SuperBasic for use by any program. The requester has many neat features, including multiple selection, automatic device configuration and a proportional scroll bar. It gives the user a quick, easy way to explore files and directories.

This process is faster and less error-prone than the command line interface of SuperBasic and the Psion packages. The idea is that your programs should call the requester whenever they need to load a file or group of files. The user can pick the name from a menu - rather than guess - tap it in, and see if the machine takes the hint!

Last month's listing read the directory into an array and displayed the first page on the screen. The new routines, listed here, let users roam swiftly through their directories, selecting files or groups en route.

Colour Codes

The requester colour-codes files and directories, and marked and un-marked names. The shades are clearly distinguishable so it still works on a monochrome screen, but of course it looks best in colour.

Like QL cursors, the requester's Mode8 colours are subtly different from the Mode4 ones, but high contrast is preserved. In Mode4, the highlight is green or white, with black text; in Mode8 it is cyan or white

around dark blue text.

You choose names by moving the highlight bar over the name, and pressing Enter to select a single name, or Space to mark it as one of a group. Marked names are distinguished by a red background, which changes to white when the green highlight bar is over them. You can cancel the mark by moving back to the name and pressing Space.

Marking is remembered even if the name scrolls off the screen. Normally names start out unmarked, but if you mark a directory name before pressing Enter, all the files in the directory are initially marked; you can cancel any you don't want by moving to them and

pressing Space again.

File and device names normally appear in green, with directory names in

white. If you press Enter while a file name is under the highlight bar, the name is passed back to the pro-

```

2030 DEFine PROCedure DOWN_DIR(mark%)
2040 IF path$=""
2050   NEW_DRIVE : IF path$="" : RETURN
2060 ELSE
2070   REMark Add directory name without " ->" suffix
2080   path$=path$ & dir$(here%,1 TO LEN(dir$(here%))-3)
2090 END IF
2100 NEW_DIR
2110 END DEFine DOWN_DIR
2120 :
2130 DEFine PROCedure NEW_DIR
2140 GET_DIR : SHELL_SORT
2150 here%=0 : Line%=0 : REDRAW
2160 END DEFine NEW_DIR
2170 :
2180 DEFine PROCedure UP_DIR
2190 LOCAL i
2200 FOR i=LEN(path$)-1 TO 1 STEP -1
2210   IF path$(i)="_" : EXIT i
2220 END FOR i
2230 IF i=3
2240   REMark Remove net file server prefix
2250   IF path$(1)="n" : i=0
2260 END IF
2270 IF i<=1
2280   path$="" : DEVICES
2290 ELSE
2300   path$=path$(1 TO i) : NEW_DIR
2310 END IF
2320 END DEFine UP_DIR
2330 :
2340 DEFine PROCedure NEW_DRIVE
2350 LOCAL key$(1),tflag%
2360 PRINT #status%;"Select drive number [1..8 or ESC] : ";
2370 REPEAT drive
2380   key%=INKEY$(#status%,-1)
2390   IF key%=CHR$(27) : CLS #status% : RETURN
2400   IF key%>="1" AND key%<="8" : EXIT drive
2410 END REPEAT drive
2420 PRINT #status%;key%
2430 path$=dir$(here%) & key% & "_"
2440 IF dir$(here%)=="N" : GET_REMOTE
2450 tflag%=ANYOPEN$(path$,4)
2460 IF tflag%<0
2470   MOAN "Directory " & path$ & " is not available."
2480   path$=""
2490 ELSE
2500   CLOSE #tflag%
2510 END IF
2520 END DEFine NEW_DRIVE
2530 :
2540 DEFine PROCedure GET_REMOTE
2550 CLS #status%
2560 PRINT #status%;"Enter remote path:"
2570 path$=EDIT$(#status%,path$,name_Limit%)
2580 END DEFine GET_REMOTE
2590 :
2600 DEFine PROCedure DEVICES
2610 LOCAL start
2620 dir$(0)=""<- DEVICES"
2630 start=PEEK_L(SYSBASE+72) :REMark Directory device list
2640 free%=1
2650 REPEAT loop
2660   IF start=0:EXIT loop

```

```

2670   dir$(free%)=PEEK$(start+38,PEEK_W(start+36))
2680   IF LEN(dir$(free%))>0
2690     flag$(free%)=dir_type%
2700     free%=free%+1
2710   END IF
2720   start=PEEK_L(start)
2730 END REPEAT loop
2740 SHELL_SORT
2750 here%=0 : Line%=here%
2760 REDRAW
2770 END DEFINE DEVICES
2780 :
2790 DEFINE PROCEDURE MOAN(text$)
2800 CLS #status%
2810 PRINT #status%;text$
2820 PRINT #status%;"Please press ENTER to continue..."
2830 text$=INKEY$(#status%,-1)
2840 CLS #status%
2850 END DEFINE MOAN
2860 :
2870 DEFINE PROCEDURE CHOOSE
2880 LOCAL k
2890 BLAT Line%
2900 SLIDER
2910 REPEAT poll
2920   k=CODE(INKEY$(#status%,-1))
2930   IF k=0 THEN SUSPEND_TASK 10 : NEXT poll
2940   SELECT ON k
2950     =208       : MOVE_UP
2960     =209       : PAGE_UP
2970     =210,213   : here%=1 : Line%=0 : PAGE_UP
2980     =212       : PICK_NAME : MOVE_UP
2990     =216       : MOVE_DOWN
3000     =217       : PAGE_DOWN
3010     =218,221   : here%=free%-text_Lines% :Line%=0 :PAGE_DOWN
3020     =220       : PICK_NAME : MOVE_DOWN
3030     =244,250   : REDRAW
3040     =32        : PICK_NAME
3050     =10        : IF here%=0 : UP_DIR : NEXT poll
3060                 IF flag$(here%) && dir_type%
3070                   DOWN_DIR flag$(here%) && pick_mask%
3080                   NEXT poll
3090                 ELSE
3100                   EXIT poll
3110                 END IF
3120     =27         : here%=0 : EXIT poll
3130   END SELECT
3140 END REPEAT poll
3150 END DEFINE CHOOSE
3160 :
3170 DEFINE PROCEDURE BLAT(place%)
3180 OVER #menu%,-1
3190 BLOCK #menu%,width%,char_y%,0,place% * char_y%,5
3200 OVER #menu%,0
3210 END DEFINE BLAT
3220 :
3230 DEFINE PROCEDURE MOVE_UP
3240 IF here%>0
3250   BLAT Line%
3260   here%=here%-1
3270   Line%=Line%-1
3280   IF Line%<0
3290     SCROLL #menu%,char_y%
3300     Line%=0 : AT #menu%,Line%,0

```

gram that called the requester. If you press Enter while a directory is under the highlight, the display updates to show the files in that directory.

The top option in each menu returns to the previous display. If you are in a sub-directory, it returns to the 'parent' that contains it. If you are already in the top or

'root' directory of the drive, the requester backs up to a list of filing devices on your system, so you can pick a new device and drive.

Drive numbers from 1 to 8 are accepted, but you should resist the temptation to select MDV8_ on early Sinclair roms, or a bug will prevent subsequent access to MDV1_! A limit of eight is

adequate for most FLP drives, but the upper limit of eight is desirable for RAM-drives and Phil Borman's DEV device.

Key Controls

The file requester recognises fifteen key-codes, but only five are essential. You

can get by with just vertical arrow keys, plus Space, Enter and Esc to mark, confirm or escape. A three-button mouse can generate all the required key-codes, or you can scroll and select names with a joystick in the Ctrl-1 port.

If you're happy with the keyboard there are several convenient extra controls. For instance Alt-Up and Alt-Down move through the list a page at a time. Ctrl-Up and Ctrl-Down move directly to the start or end respectively; if you prefer to use one hand you can press Shift and Alt instead of Ctrl, for the same result.

Press Shift together with the Up or Down arrows, and the highlight moves through the list, selecting names as it goes along. This type of 'drag selection' is a convenient way to mark a group of files, as the keys auto-repeat and new names scroll into view if you hold down the combination.

The requester is designed for multi-tasking use on any Qdos system, so it must be possible to re-draw the screen if it is obscured by any other task. It recognises both the F4 keypress, used by Devpac, Qlipboard and other programs, and Shift-F5, favoured by Psion. All input takes place in channel #0, which has an active cursor, so it can be selected with Ctrl-C.

The requester updates path\$ and returns the full name of the file selected, or a null string if Esc was pressed. If multiple selections are allowed the caller must search FLAG% for entries with the PICK_MASK% bit set, and process all corresponding NAMES\$.

The listing

The program lines listed here complete last month's listing. The central procedure is CHOOSE, which waits for a key-press in the STATUS% window and returns a key

code. Line 2930 is optional, and suspends the task for ten frames, a fraction of a second, if INKEY\$ returns a null code. This line stops the task hogging the processor if input from the window is temporarily disabled. Leave it out if your system lacks the Turbo Toolkit SUSPEND_TASK command.

CHOOSE calls other procedures with mnemonic names if it detects a valid control character. The codes are listed in the Concepts section of the QL User Guide, and can be extended or substituted to suit yourself. In general they conform to accepted QL usage, so it is best to add new codes

rather than change existing meanings.

Two variables are crucial to CHOOSE and the procedures it calls. HERE% is the number of the current entry in NAME\$ and FLAG% that is under the highlight bar. LINE% is the display line now occupied by the highlight, numbering the top line

zero to suit the AT command. Procedures like PAGE_UP and MOVE_DOWN manipulate these variables as well as the screen, so that the program and display cannot get out of step.

Readable BLAT

BLAT is short for BLOCK AT, and prints a green or cyan block over the text line indicated by its parameter. OVER -1 is selected so existing colours are combined with the green according to an 'exclusive-OR' rule, and the original text remains readable. For instance green text on black paper becomes black on green after BLAT. Use BLOCK colour 4 instead of 5 if you prefer the Mode8 colours to match the Mode4 ones exactly.

BLAT is usually called from PICK_NAME, which uses exclusive-OR again to toggle the mark indicator for the name in FLAG%. This time the ^^ operator modifies bits of the array, rather than the screen. Line 3540 alters FLAG%(HERE%) to reverse the state of corresponding bits set in PICK_MASK% && FLAG%(HERE%) reads the current value of the bits, as we saw last month.

Bit 8, decimal weight 256, is the only set bit in PICK_MASK%, so the line has the effect of resetting that bit in FLAG% if it is currently set, and otherwise setting it. So every time PICK_NAME is called, the flag for the name toggles from unmarked to marked, or back again.

I use the bitwise operators ^^ and && rather than conditionally adding or subtracting 256 because I wish to leave the other bits unchanged, so they are free for other uses. If you don't mind wasting a few bytes for each name you could keep the marks in a separate array, but this seems a

```

3310      ECHO_NAME here%
3320      SLIDER
3330      END IF :REMark Scroll down
3340      BLAT Line%
3350      END IF
3360      END DEFine MOVE_UP
3370      :
3380      DEFine PROCEDURE MOVE_DOWN
3390      IF here%<free%-1
3400      BLAT Line%
3410      here%=here%+1
3420      Line%=Line%+1
3430      IF Line%>=text_Lines%
3440      SCROLL #menu%,-char_y%
3450      Line%=text_Lines%-1 : AT #menu%,Line%,0
3460      ECHO_NAME here%
3470      SLIDER
3480      END IF
3490      BLAT Line%
3500      END IF
3510      END DEFine MOVE_DOWN
3520      :
3530      DEFine PROCEDURE PICK_NAME
3540      flag%(here%)=flag%(here%) ^^ pick_mask%
3550      AT #menu%,Line%,0
3560      ECHO_NAME here%
3570      BLAT Line%
3580      END DEFine PICK_NAME
3590      :
3600      DEFine PROCEDURE PAGE_UP
3610      LOCAL top%
3620      top%=here%-Line%-text_Lines%
3630      IF top%<0 THEN top%=0 : Line%=0
3640      FILL_WINDOW top%
3650      BLAT Line%
3660      here%=top%+Line%
3670      SLIDER
3680      END DEFine PAGE_UP
3690      :
3700      DEFine PROCEDURE PAGE_DOWN
3710      LOCAL top%
3720      top%=here%-Line%+text_Lines%
3730      IF top%+text_Lines%>=free%
3740      Line%=(text_Lines%-1)-((free%-1)-top%)
3750      top%=free%-text_Lines%
3760      IF top%<0 THEN top%=0
3770      IF Line%>=text_Lines% : Line%=free%-1-top%
3780      END IF
3790      FILL_WINDOW top%
3800      BLAT Line%
3810      here%=top%+Line%
3820      SLIDER
3830      END DEFine PAGE_DOWN
3840      :
3850      REMark **** BASIC versions of simple Toolkit functions;
3860      :
3870      DEFine FuNction MPEEK$(addr,len%)
3880      LOCAL p,t$(name_Limit%)
3890      t$='': REMark Use Turbo Toolkit PEEK$ for more speed
3900      FOR p=addr TO addr+len%-1
3910      t$=t$ & CHR$(PEEK(p))
3920      END FOR p
3930      RETURN t$
3940      END DEFine MPEEK$

```

waste when only one bit is needed and Qdos file types in FLAG% use just one byte each.

Device selection

The new listing starts with routines to move between devices and directories. DOWN_DIR tacks the first part of the current NAME\$ entry onto the PATH\$ string, then calls NEW_DIR to

read the directory, sort it, and redraw the name list from the start. You could make SHELL_SORT conditional if you prefer to see names in their directory order.

UP_DIR searches backwards through PATH\$ for an underscore, and truncates the path-name at that point. A special check is needed to strip the network server prefixes N1_ to N8_ as they are not valid directories. If anything is left, NEW_DIR reads the directory; otherwise DEVICES is called to select a new device.

DEVICES searches the directory device list and extracts the current names of all available drives from the device definitions held on the common heap. PEEK_L(SYSBASE+72) finds the first such device, which starts with the address of the next, and so on until zero indicates the end.

The definition contains lots of interesting information, documented in the Qdos Companion and DIY Toolkit, but in this case all we need is the text string at offset 38 in every file device definition. This is a string

```

3950 :
3960 DEFine FuNction MINIM%(a%,b%)
3970 IF a%<b%
3980   RETurn a%
3990 ELSE
4000   RETurn b%
4010 END IF
4020 END DEFine MINIM%
4030 :
4040 DEFine FuNction SYS_BASE
4050 LOCAl t$(4) :REMark Avoid "JS" VER$ bug
4060 REMark t$=VER$
4070 REMark IF t$="JSL1"
4080   REMark RETurn VER$(-2)
4090 REMark ELSE
4100   RETurn 163840
4110 REMark END IF
4120 END DEFine SYS_BASE
4130 :
4140 REMark STRING% is in Turbo Toolkit & PD Toolkit, & BASIC
4150 REMark in QL World; see listing on page 17, January 1993.
4160 :
4170 DEFine PROCedure S
4180 SAVE FLP1_REQUESTER_BAS
4190 END DEFine S

```

prefix used to identify drives handled by this device; typical names are MDV, RAM, FLP, FDK, WIN, DEV and N, plus anything you set up with NFS_USE from Toolkit 2 - initially null.

Alternative Names

You can POKE alternative names into these entries. Only four bytes are reserved for the text, but it's feasible to use TAPE and DISK (or DISC) instead of MDV and FLP. Just don't expect pre-configured programs like Psion's original QL suite to recognise them! They need MDV2_, and TAPE2_ upsets them but you could use DEV to re-direct, say DEV2_ to TAPE2_. Psion will never notice ... but YOU may get confused.

Whatever names your system answers to, DEVICES will find them and put them into the NAME\$ array for selection. If the names change, due to _USE or loading a new device, press Enter on the heading entry 'DEVICES ->' to update the

list. There's no need to amend the program for new names; use this, and you'll make life easier for people with networks and novel devices.

Once a device name is selected NEW_DRIVE lets you pick the number. If ANY_OPEN% finds that a drive such as FLP6_ or MDV7_ is unavailable, a message appears and you get another chance.

Again the prefix N is treated specially; GET_REMOTE gives the user a chance to extend the network prefix with any drive name, using Turbo's EDIT\$ or its DIY Toolkit equivalent EDLINE\$. It is wise to add a command to re-enable the cursor after line 2570.

SuperBasic Extras

The listing ends with three SuperBasic routines which stand in for toolkit functions which may not be available. MPEEK\$ is the equivalent of Turbo Toolkit's PEEK\$. Replace PEEK\$ at line 2670 with MPEEK\$ if not using

Turbo. Call SYS_BASE instead of SYSBASE in line 2630 if you do not have the DIY Toolkit extension. Remove the REMs at the start of lines 4060 to 4110 if you need the Basic to work in Minerva's two-screen mode.

MINIMUM% is called by line 1470 in last issue's listing. Substitute MINIM% unless you have the DIY Toolkit equivalent. A Basic version of STRING% appeared in QL World, January 1993, and may be used instead of its name-sake in Turbo Toolkit or Mark J Swift's PD Toolkit, on Speculator and Amiga Qdos PD disks.

Homework

The requester works well already, but there's lots of scope for further development. The FLAG% array holds the type of each file, and could be used to distinguish between task files (type 1) much as it distinguishes directories and other files at present. This information is available to the caller as it is set up in

the FLAG% array when the requester returns.

Rather than check for errors later, the requester could be passed a 'mask' so that only files of a particular type are shown, depending on the application. For instance a task launcher could sift out type 1 files, a linker needs type 2, and a Z80 disassembler expects Speculator's type 6 CODE files.

If you use Turbo the requester could comprise a shared module, LINK_LOADed with any task that needs it. You must declare four global variables: MARK%, PATH\$, and the NAME\$ and FLAG% arrays.

These variables, and the REQUEST\$ function, must be declared as EXTERNAL or GLOBAL so LINK_LOAD can make them correspond. The variables are normally EXTERNAL to the requester and GLOBAL to the callers, so they can be passed in and out, while the function is EXTERNAL to the callers

and GLOBAL to the requester. All the rest is hidden inside the requester module.

The advantage of LINK_LOAD is that you can change any module without needing to re-compile the other modules that it uses. Thus improvements in the module become available to all tasks that LINK_LOAD it, as soon as the requester is re-compiled. Alternatively you can carry on using the same requester code even if you change the programs that call it.

Scroll Bar

At present the scroll bar serves only as a display, showing the proportion of the directory currently visible, and its position. If there is room for the entire directory on-screen, the bar is the full height of the menu. You cannot yet point at it and move it around, with corresponding changes in the

menu, as is possible in some windowing systems. This requires a pointer independent of the highlight, which is a good idea if you use a mouse but less useful under keyboard or joystick control.

If you have Gram, Qpac or the Amiga Qdos emulator you may like to activate the scroll bar to recognise and respond to clicks in that part of the screen. The normal convention is to scroll the menu one page at a time if the user clicks above or below the active part of the bar. It's easy enough to implement this by checking the mouse co-ordinates and calling PAGE_UP or PAGE_DOWN each time the button is pressed in the relevant place.

A slightly more complicated case occurs when the user clicks on the active part of the bar, and moves the mouse up or down in an attempt to drag the bar. This should cause the bar and menu to move up or down

in sympathy with the mouse. On a slow computer it is best to move the scroll-bar alone, until the mouse button is released, and then re-display the menu at the appropriate place. Distracting flicker is almost inevitable if you try to update the menu and the bar at the same time.

Network enthusiasts could modify DEVICES to open a MEM channel and read the device names from a remote file server. You need to replace PEEK_L with SET_POS and INKEY\$ or INPUT\$ calls to read the remote memory. Good luck!

The Future

In future columns I plan to build a directory management utility around this requester. Meanwhile I'm keen to hear what use you make of the file requester, and welcome news of updates for particular applications.



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We have been rather starved of major software releases since **Perfection** and **Text87 Plus-4** appeared, but there is now a new program which definitely comes in the "major" category - **LineDesign**. It is to be expected that word processing programs hog most of the limelight, but there is a significant demand for graphical programs on the QL. While other computers have been favoured by both drawing and presentation programs of high quality, the QL seems not to have received enough attention in this area. The Belgian brothers Joachim and Nathan van der Auwera - trading as Progs (Professional and Graphical Software) - have produced much software previously, including a drawing program, LineDesign is their biggest production so far.

The first point about the program to catch my eye was the vector drawing. Briefly, this means that the poor quality usually associated with enlargement of images and founts does not

occur. The reason is that any element of the image is defined mathematically, which give equal accuracy at small and large sizes; in contrast, standard bit-mapped images look increasingly jagged as they are enlarged. That is a good starting point, and the program has other merits adding up to a much more serious contender than we have seen recently in the QL graphical drawing market.

Eleven Disks

There is no avoiding the fact that LineDesign is big, in both space and cost. For your £100, you get eleven double-density 3.5-inch disks; clearly, this is not a program which will be supplied on cartridge. Five disks contain clip art (images ready for use), five more contain founts, and the remaining one holds the program itself. The program disk includes the Pointer Environment files WMAN, PTR_GEN, HOT_REXT and MENU, from Tony Tebby

and Jochen Merz.

Many users will want to mix text and images, and LineDesign allows this, but a large text really requires a proper wordprocessor to prepare it. Software87 has co-operated with Progs and produced a revised version of Text87, together with the necessary appendages to link it and LineDesign together, for the production of the kind of document which used to require a DTP program. The combined package comes under the name of **Plus-4 Publisher**, and contains everything the user should require (see separate review).

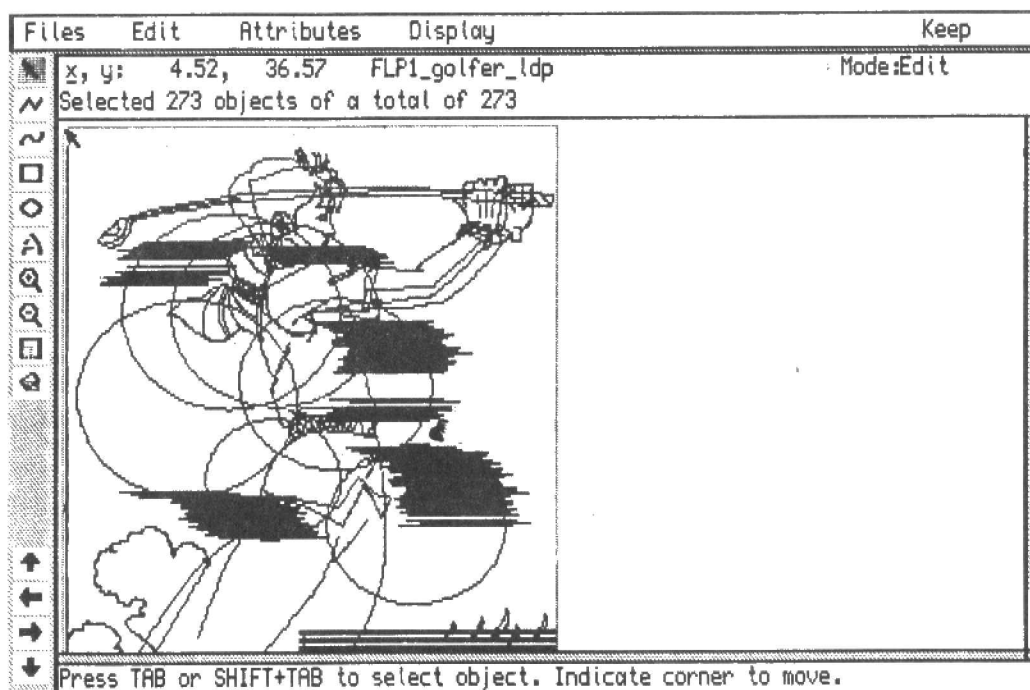
Impression is what graphics packages tend to be about. The impression of images on the screen, the impression given by the printed output, and also the general feel of the package. The instructions for LineDesign are in A4 format, well laid out, in a decent typeface, and with a transparent protective cover. There is plenty of textual explanation, and illustrations

of supplied clip art and founts. The booklet covers about 80 sides.

Disk Packing

The first task is a big one - copy all the disks! If you are fortunate enough to have HD or ED disk drives, you can pack the clip art and founts on to a lesser number of disks, as there is no nasty element in the installation process that requires the ancillary files to be on specific disks. The clip art all fits onto one ED disk; the founts would probably fit onto one ED, too. The program requires most of a DD disk. An HD disk would be required to hold both LineDesign and Plus-4 Publisher. A hard disk drive would be an advantage, and the program understands sub-directory names, so that founts can be put into one directory, and clip art into another, to suit the user's convenience.

LineDesign uses the Pointer Environment, and a few pages at the end of the



instructions are devoted to information on this and the menu structure. A mouse is a desirable - almost essential - tool with any graphics program, and with the Pointer Environment. The SERMouse mouse and driver (see review in *QL World* Vol. 11.6) were used for this review.

In their introduction to the program, the writers say they "wanted to bridge the gap a little bit", between existing

ally much better than their PC counterparts in this respect. One further statement is also welcome - people who report bugs will get free updates. Again, this is not a new approach, as it is fairly common practice, but it is nice to see it put into print.

Vectoring

The vector approach allows the description of a drawing element to take less



graphical software for the QL and the more professional offerings for the PC, and "to become competitive with mainstream PC Windows programs". There is certainly some sense in this, although it is to be hoped that they do not go too far down the Windows route (needs massive amounts of memory and disk space to run anything). There is a frank statement that the program requires a lot of memory and is "not very quick". It is very refreshing to have suppliers being honest about their product in this manner, and QL suppliers are gener-

space than would be required with the bit-mapping technique. The supplied founts also are vector-drawn, and therefore, scalable; this results in less space being taken for founts, both on disk and in a drawing file. It is not all plus-points, though, and the calculations required to produce images from vector descriptions take a fair amount of memory and time. The big factor is that the results are better. The "jaggies" are done away with, circles look like circles, and characters look good at any size.

The instructions give infor-

mation on some of the terms used - "object", "path" etc. - but the full meaning of these is not clear until the program has been used for a while.

Having HD or ED drives, or hard disk, will make life a lot easier, as there are many files that one would prefer to have available on one or - at most - two disks. Alternatively, you could modify the boot routine to copy fount (and other) files to ram disk, and this would make operations both faster and more convenient. To make sensible use of ram disk, you need 640 KB or more of memory. The program (including extensions) takes roughly 500 KB, but the amount taken can be much greater; with the file for the third illustration loaded, about 1.2 MB of the GC's total of 2 MB were in use, without any ram disk use. Fount files take (typically) 30-100 KB each, and some nearer 200 KB.

No Fuss!

The program starts up with no fuss and goes straight into the editing screen, which occupies most of the display area. The first illustration shows this screen, after one of the sample files has been loaded. The Magnify function has been used to reduce the size of the image to fit the visible screen area. This illustration is a screen dump, using the Gold Card Epson LQ-2500 mode. Compared to a print made directly from the sample file (see the second illustration), there are dark patches which should not really be there. What appears to be happening is that individual drawn objects are showing through other objects laid over them. The white clouds cover up the dark patches when printed normally. This is no problem, provided you bear it in mind while creating drawings.

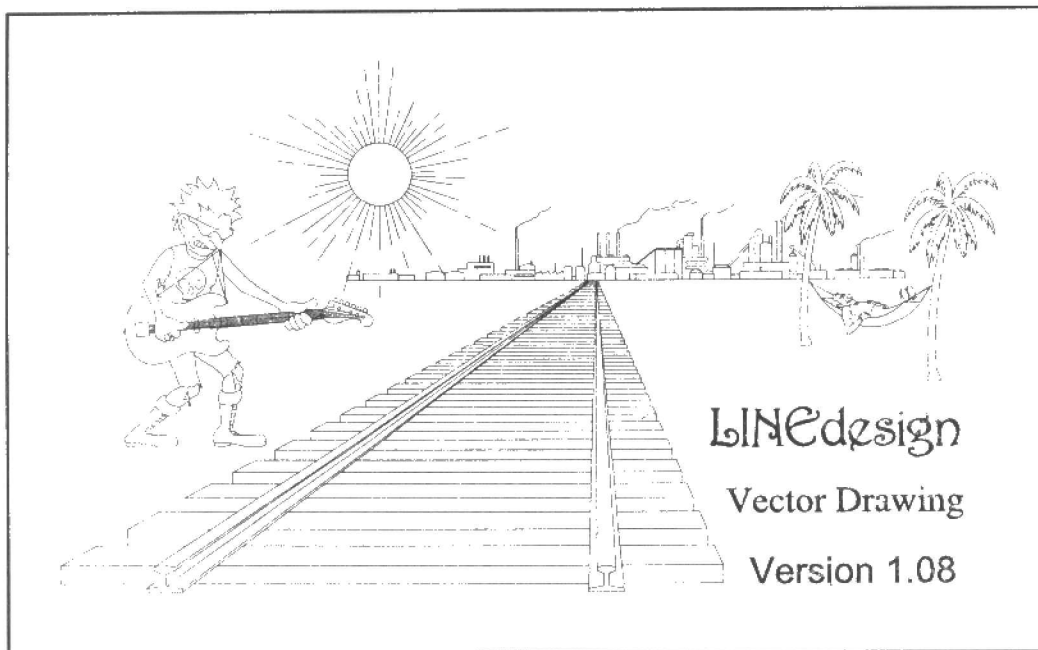
The main menu bar is across the top of the screen.

Immediately below that is the Status area, with space for two lines of information. The upper line shows the x-y co-ordinate position of the mouse pointer, the loaded file name, and the current working mode; the lower line will display details of the current working page, such as the number of (drawing) objects contained on it. At the bottom of the screen is the Report Line, which gives information on what is currently happening. Scroll bars appear above the bottom line and down the right side of the screen, at appropriate times. A tool bar, displaying the available editing tools, is down the left side of the screen.

A program like this needs sample files, to get the new user going. Some of the supplied sample files, while good, created errors when loading. These could have been avoided, if some advice had been given in the instructions. The problem was that files containing text cause the program to look for the founts used, and they were not on the default device (flp1_, as supplied), presumably because of lack of space. Re-configuring the program to look to flp2_ for founts provided the solution, but not until it had been ascertained what founts the sample files used, and that took some time; unless the fount files and a file named FONTMAP are copied from the program disk to the disk used in the default fount device, you cannot use text at all. Configuration is by means of the Pointer Environment CONFIG routine.

Print Runs

According to the message on the Report Line, at the bottom of the screen, the printing of the sample file in the second illustration took 17 "runs", which occupied a period of about 13 minutes. These runs are internal to the program - you don't



have to put the paper through the printer 17 times! Note that it is the sample file itself being referred to here - the first illustration is actually a screen dump, which took less time (about 4 minutes) but, naturally, produced a dot-matrix print of much lesser quality. The second illustration gives a true impression of the quality of printing with a Hewlett-Packard LaserJet compatible printer. As yet, printing cannot be done in the background, so you have to wait until a print is completed before getting back to editing. The provision of background printing is something Progs intend to work on.

A decent selection of printers is catered for. The list includes the Hewlett-Packard DeskJet and LaserJet, IIP and III, Canon BJ-10 (BubbleJet), and Epson-compatible 9- and 24-pin models (in four forms each). Serial and parallel printer ports are supported. The industry standard LaserJet is the Series II, and it was assumed that this model was the one involved when the "LaserJet" printer option was selected. However, a couple of test prints using this selection resulted in images that were only vaguely recognisable; the second illustration was

the result of selecting the "LaserJet IIP" option. This image was near enough identical to one in the instruction booklet and can be taken as representative of the quality obtained using HPLJ mode. A surprising omission is a facility to change from portrait to landscape paper orientation.

Use of menu options is fairly straightforward. The main menu bar, across the top of the screen, follows the standard micro convention of placing the Files item at the left. You get help, in limited form, on the report line. Selection and activation of menu options is done by using the standard button actions. As is normal with the Pointer Environment, the functions of left and right mouse buttons are not clearly separated, and you can use either of them for selecting options, but the right one is needed for activation of the selection.

Menu Options

Taking the main menu options from left to right, clicking on File causes the options Save Page, Load Page, Merge Page, Named Save, Print Page, View Page, Clear Page and Quit to be listed. The only one of these which might need explana-

tion is Named Save; it is better known as Save As, and allows the current page to be saved under a different name from the one displayed on the status line.

The Edit menu consists of Slant Object, Transform Object, Combine Objects, Delete Object, Edit Nodes, Grid (Snap To), Front (Move To), Back (Move To) and Text To Curves. Any object, including text, can be slanted, in the range 45 to +45 degrees. Transform Object allows the rectangular box in which the selected image is contained to be re-shaped; the four corner points can each be chosen. Edit Nodes enables image shapes to be changed by moving the defining points for the individual objects within the image. If this concept is difficult to visualise, you need to understand that vector-drawn images consist of a collection of small sections - lines and curves - with control points to determine lengths, shapes, and relationships. What looks at first like a one-piece drawing turns out to be manifold, unlike a bit-mapped image. Combine Objects does just that - groups together a selection of objects. The objects must have the same attributes, and cannot be parted once combined. Delete Object gets rid of the

selected object.

Snap To Grid causes all nodes or individual points on an object to snap to the nearest grid intersections. This allows a relatively inaccurate drawing to be made into a more regular one. Move To Front and Back are the reverse of each other, the former making the selected object sit on top of all other objects, the latter placing it behind all others. Look at the **first** (screen dump) illustration to see an image where this function could be significant; the white clouds (and the golfer) clearly have to be in front of the etched horizontal lines when the total image is printed, although they appear on the screen as though they are behind the lines. The **second illustration** shows the correct relationship of these parts of the image. Text To Curves makes every character a collection of curves, enabling each one to be manipulated separately. This will, for instance, allow kerning (the adjustment of spacing between adjacent pairs of characters).

Word or Pic?

The Attributes menu demonstrates one problem in getting used to the command structure of LineDesign. Text and graphics operations are not kept separate, so some of the options on this menu refer to one or the other, but not to both. In the sense that text may be treated (in the computer) as just another graphical item, it is proper to lump what we usually think of as two quite separate things together, but we (at least, older folk!) are taught that words are words and drawings are drawings; even in the computer world, there are text and graphics modes, implying that the two are quite separate.

The Attributes menu options are Typeface, Size Of Font, Filled, Outline

than the actual display area. The scroll arrows (at bottom left), and combination of the Alt key with the arrow keys, allow the displayed area to be altered. This permits quite large drawings to be created. It is rather difficult to envision the look of that part of a drawing which is not currently on the screen, but a View Page option on the File menu displays the total image, with the right-hand boundary of what will print on the A4 page. The boundary line was somewhat optimistic, including parts of the page which were beyond the edge of the printout, but it serves as a useful guideline!

An object can be moved, copied and scaled. Moving is simple - select the object by pressing the Tab key until that object is outlined in red, place the mouse pointer on part of the outlined area, click the left or right button, move the pointer to the desired location, then click the right button. Copying is the same operation as Moving, except that you press the + key or click on the Keep menu option beforehand. Scaling is essentially simple, too, but can take longer because you may want to identify sides or corners of an object which are not visible on the screen. You cannot move the pointer outside of the edit area, and the object is not scrollable once the Scale function has been selected. You have to scale within the limits of what can be seen; it may take several operations to produce the desired size. Alternatively, the Magnify tool can be used to reduce the image size, and make all of it visible at the same time; the drawback of this is that it makes selection of small sections more difficult.

Speed Limits

Most operations are carried out with acceptable speed, on a QL equipped

with a Gold Card having 2 MB of ram. In fact, the redrawing of objects is surprisingly fast. There is no denying, though, that some operations take a long time to be completed, particularly as the image size and complexity increases. Loading clip art seems fast, but saving pages is slow (because of the work involved in specifying each individual object, within the composite page). As always, it has to be pointed out that it is very easy to forget how much slower life is without the GC. Before too long, the same will have to be said about using the QXL card, compared to using the GC. Printing graphics is never a fast business, and this is not a thing peculiar to LineDesign. For the review, printing was done via a serial connection, but a parallel connection would, most likely, not have been any faster.

The clip art and founts supplied are both numerous and generally good. There are over 150 clip art images and nearly 60 founts on the supplied disks. Some samples of them are shown in the **third illustration**. This is an assembly of seven clip art images, with text in three of the supplied founts added. Each image consists of several "objects", and this illustration has around 600 objects in it. One of the snags of creating something like this is that, to identify an image for working on it, you have to use Tab or Shift-Tab to cycle through the objects, and that means through all individual objects. This can be a lengthy task, and there seems to be some uncertainty about a group of objects (which make up the image you want to select) being marked as an entity, to enable you to manipulate the group as a whole. There appears to be no way of clicking on the frame containing the image, as you would typically do in a PC program. The best course is to ensure that any operation needed is done as soon as

an image is merged into the overall page, while it is still clearly selected.

In order to increase the "pool" of images available, two conversion programs are provided. The one will change the format of Adobe Illustrator .AI files into the standard _LDP format of LineDesign. The AI format is used by CorelDraw!, possibly the best-known graphics program on the PC; this comes with a massive selection of clip art, mostly on CD rom. This is hardly a common format, though; .TIF, .PCX and .BMP are more common. You are warned to remove the control codes from IBM or Apple format files, but no information on doing this is given.

Mode4 Images

The other conversion routine is for QL Mode4 512 x 256 pixels image files. This routine is also used for tracing bit-map drawings, to produce vector drawings which can be scaled without loss of quality.

The supplied founts are fairly varied, and mostly decent. A few samples are shown in the **fourth illustration**. There is a fount of animals, and one of objects (both are used in the illustration).

Error trapping of disk operations is not complete. You need to ensure that the device and file name chosen are both real and correct, before a file command is selected. This is especially true when you are creating a composite page, using the supplied clip art. To be able to add an image to an existing page, the Merge command has to be used. The current file then takes the name of the latest merged file; if you use the Save Page command, forgetting to select Named Save instead, you may end up overwriting the clip art, and wondering what happened to your masterpiece.

Operations become

noticeably sluggish as the image gets more complicated - that is, as the number of objects in it increases. Response to the mouse is initially quite positive, but can become frustratingly delayed. A useful point to remember, for occasions when the dreaded PE padlock appears and will not go away, is that stepping out of LineDesign into SuperBasic (or any other program that is loaded) with Ctrl-C, and then back in again, seems to be a sure way of clearing the blockage.

The emphasis in this review has been on images rather than text, but DTP does deal mainly in text plus pictures, rather than the reverse. LineDesign can handle text, but is not suitable for any large amount of it; hence the useful link with Text87.

Conclusion

LineDesign produces results, and is definitely a step in the intended direction. Later versions can be expected to address the areas where improvements seem indicated, but the program is good as it stands. You need to practice with it a fair amount to learn how to get what you want; but that is true of any of the major DTP or WP programs for the QL or any other computer. The instructions could be more helpful to the user who is not familiar with ways of tracking down why things do not work as expected. Writing a program like this is a big project, and the writers of LineDesign show an honest appreciation of things that still need to be done. This attitude should give the prospective purchaser assurance that problems he or she comes across will be dealt with. In the meantime, V1.08 is capable of producing good results, without straining the operator unduly. It is the printed output that matters, and that is good.

Publishers Pack

Text87 can be linked to LineDesign. Bryan Davies explains how.

INFORMATION

Program: Publisher's Pack: Text87 3.9, LineDesign 1.08, MiniDrive and MaxiDrive, Founttext93

Price: £199

Supplier: Software87, 33 Savernake Road, London NW3 2JU. Tel. 071 485-9008 (1400-1700 hours only)

Plus4 Publisher, or Publisher's Pack, is a combination of the latest versions of **Text87** and **LineDesign**. Version 3.9 of Text87 comes with the tools necessary to use it in conjunction with the vector-drawing program LineDesign (from Progs in Belgium), plus an updated version of the graphical printer driver, now called Founttext93. LineDesign v1.08 has been reviewed separately; this covers the part Text87 plays in the combined operation. For simplicity, the two programs are generally referred to here as T87 and LD.

Documents containing text and graphics can be prepared partly in T87, partly in LD, then printed in a two-stage process using both programs, or a one-stage process using LD alone. The choice is yours, but which is the best route to take should be clear from the type of document being printed; in general, DTP documents tend to contain mostly text, and T87 is preferable for printing the text portion of such documents, but LD should be used for pages which consist primarily of graphics.

Not for Editing

You are limited to 80 characters of text, in one chunk, when entering text directly into LD, and you cannot edit more than 80 characters in a file merged into a LD page; there is little in the way of text formatting capability. It is clear that there is a need for an editor or word-processor to prepare text for the program.

One approach to text-plus-graphics printing is to create and print the text with T87, and create the graphics and print them on a second pass, from LD. To facilitate production of accurate documents, the document layout can be saved from T87 and used in LD, as a guide for placement of graphics. An alternative approach is to create a layout for both text and graphics, type and format the text in T87, then merge layout and text into the LD page containing graphics. As the new printer drivers for T87 do not cater for all sizes of the LD founts, items such as headings in large text will have to be created in LD.

Version 3.9 of T87 (version 4.0 is under test at review time) is supplied with two printer drivers for use with LD - MiniDrive and MaxiDrive. The prime difference between them is the numbers of fount sizes they support. While both of them support all the LD founts (nearly 60 in total), the former allows only one size of each (two for a few) whereas the latter allows four sizes (eight for a few). As would be

expected, there is a considerable difference in file size, but both drivers are big - approximately 40 KB and 150 KB.

Spellchecker

The Publisher's Pack approach solves a problem that faces users of many DTP programs - lack of a spelling checker. A version of the QTyp spelling checker is supplied with T87. A quick glance at the LD instructions indicates that they were not shown to QTyp! (There was even the odd word in the Publisher's Pack instructions which should have raised the checker's eyebrows).

Anyone already familiar with T87 Plus-4 should have no difficulty using the added linkage to LD. You load MiniDrive or MaxiDrive as you would any other driver. Layout design is done in the same way as you would do it for any normal T87 document. Blank areas (frames) are left, for graphics to be inserted later in LD.

Two procedures are given for the transfer of T87 text to LD. Both methods are accessed through the Print menu, which now has a "Linedesign" option on it. The sub-menu under this option offers "Layout transfer" and "Text transfer". Whichever option is chosen, the result will be a file with the extension _LDP, which can be loaded or merged directly into LD.

Layout transfer does just that - it produces a file containing only the layout of the current document. The new printer drivers are not used

for this operation. When the layout file is loaded into LD, the frames showing areas reserved for text appear on the screen, but they do not print, unless you deliberately change the outline colour to black. You go ahead and create graphics, and any additional text, in the "free" areas. Having done this, you print the graphics from LD, put the paper back into the printer, fire up T87, then print the text. That is, printing is a two-stage operation. You can, equally well, print the text first and the graphics second.

Text Transfer

Text transfer follows essentially the same path in T87, to the point where the export file is created. The first obvious difference is that Text Transfer requires the use of one or other of the new drivers. The two new printer driver files support all the LD founts, although they are not all displayed as themselves on the T87 screen. It would be a laborious task to load up to roughly 240 screen fount and size combinations, and there would not be any great merit in doing so. It is suggested that, once you have picked a few favourite LD founts, you load just them for screen use in T87.

The drivers are "LineDesign aware" and the image of the text will be correct once it is displayed on the LD screen. Before that stage is reached, you can get a good idea of what the final (text) pages will look like by using the T87 print pre-

view command. The two drivers do not support bold, underlined or italic text, as these attributes are not available in LD, but "outline text highlighting" can be obtained by using the T87 Bold command, and text can be superscripted or subscripted. Once the text file has been merged into LD, use can be made of that program's text manipulation features. For example, the text point size can be set to any value over a very wide range.

Whether printing is a one- or two-stage process depends to a fair extent upon the text/graphics mix of the document. If there is a lot of text, T87 will print it faster than LD and it makes sense to type the text, using your normal printer driver file, and print it from T87. The layout is transferred to LD, and the graphical part of the page created there. The LD file is then printed to the page which already has the

T87 text on it. For a lesser amount of text, the printing process can be one-stage, both text and layout being transferred to LD, where the graphics are added and the complete print done. You actually transfer two files - the layout alone in one, and the text in the other so both Layout transfer and Text transfer are used in this latter approach.

Take Time

Long-time users of T87 know that it takes rather longer than Quill to get to grips with, and they will appreciate that some time needs to be spent, gaining an understanding of the overall process of linking it with LD. Sample files are provided, together with instructions, to allow the user to go through the stages of document production, without undue strain.

Patience is definitely a virtue in this kind of work.

The illustration here is one of the sample pages, slightly modified, and it took many minutes to get a preview of it in LD. The time for drawing and re-drawing the screen obviously increases as you put more objects onto it, but it is hard to accept that a relatively small amount of text, with one simple graphic added to it, should take more than the odd minute or so (on a Gold Card system). Printing took 30 minutes.

Text87 Plus-4 undergoes continuous development. Users of version 3 will not find 3.9 much different, but the changes are ones that have been asked for, and are worth having. Apart from the LineDesign menu options, there are the following changes (this is not a full list):

The initial menu has an **Import** option (from 3.1 onwards).

The **Ruler** displays the co-ordinates of all three margins - First Line (indent), Paragraph (left) and Right (also introduced with 3.1). There is now a Ruler Selector, which allows you to choose from the rulers which have already been defined, when wanting to apply different formatting to the current paragraph. A New Ruler command allows a copy to be made of the current ruler; as soon as this has been done, the Ruler-Edit menu appears, for you to make any required changes to the ruler copy. The changes are applied immediately to the current paragraph. It is no longer necessary to position the cursor exactly over a Tab on the Ruler in order to delete that tab.

Page breaks are not redrawn during editing, unless their position changes.

During use of the **Block**

command to change the typeface of several blocks in succession, the positions of block markers match that of the flashing cursor.

When the **typeface** is changed in large blocks, using the Block command, the block is always reformatted.

Founttext93 is quite separate from the T87-LD link. It is included as a free extra in the Publisher's Pack. It is a high-resolution (180 x 180 dots per inch), graphical printer driver, suitable only for 24-pin Epson-compatible printers. Essentially, it produces print that looks the same as what is on the screen. It is close to being true WYSIWYG. One result of the high resolution is that printed characters look much smaller than they do on the screen, and you are advised to use large point sizes, such as those of the Roman21 fount.

Conclusion

There will no doubt be complaints that the process of integrating Text87 Plus-4 and LineDesign is not straightforward enough. Personally, I have not met any program capable of producing the kind of documents we are talking about here that is easy to use. Quite simply, the production of DTP documents requires a fair amount of effort and thought. Publisher's Pack will not present any real difficulties for people who can handle the existing T87 versions, or any of the other major WP, DTP or graphics programs. The results are good. With a laser or inkjet printer, careful selection of founts and clip art will enable the user to create very professional-looking pages. If you draw reasonably well, or have an image scanner, and can introduce your own images into documents, so much the better. Next step, colour...

plus4 publisher

QL Desktop Publishing and Wordprocessing at its Best

NEWS!

Software ⁸⁷ are pleased to announce an important development on the QL software scene.

Thanks to plus4, QL users have been able to produce high quality text output matching that of expensive PC word processors. But, until now, no QL program has been able to produce drawings and large text of similar quality (resolutions of up to 360 x 360 dots per inch).

The new page design program LINEdesign allows the creation of pages consisting of scalable drawings and text. Once you have drawn an object, you can move it around the page, enlarge or reduce it, expand or squash it, rotate or transform it without losing any detail and without affecting other objects.

In addition, LINEdesign can do the same with text, using any of the 57 scalable founts

plus4 and LINEdesign work together

Text from plus4 can be combined with LINEdesign output in two different ways. Using one method, text is produced and printed with plus4. The layout is then sent to LINEdesign for positioning the graphics and headlines which are overprinted on the page from LINEdesign. The other method allows text to be formatted in plus4 using founts supplied with LINEdesign. Formatted text, including fount selections and justification, is sent to LINEdesign for adding the graphics.

supplied with the program. Each fount can be printed in any size from small print to huge headline without loss of



quality. LINEdesign is supplied on eleven disks which contain the program, the founts and a large number of

ready-made drawings (clip-art) for inclusion in your publications.

Publisher's Pack allows you to combine the text editing and printing capabilities of plus4 with the graphic and fount handling power of LINEdesign.

A step-by-step guide, together with several sample documents and ready-made graphic objects for desktop publishing, such as shadowed boxes, provides all you need to start preparing your own professional quality publications.



Di-Ren Launch Voice Analyser!

Di-Ren, of Fleet Tactical Command fame, have a hardware add-on so new that they don't yet have a name for it!

The mystery accessory is known as the **DPR020**. Its purpose is not, however, a mystery: it is a hardware speech analyser, designed to connect to any computer that has (or can provide) RS232c, 8-bit serial link capability. It is also an advance on traditional 8-bit delta modulation analysis, now using 12-bit analogue to digital (A/D) conversion in up-to-date sound analysis LSI's (large-scale integration chips). The new method of analysis is called ADPCM (adaptive differential pulse code modulation). This applies a 4-bit analysis to each frequency sample period, makes its calculations with reference to previously encountered data, and returns a higher degree of accuracy than delta modulation analysis. The DPR020's microcontroller also compresses the data to make it easier for the computer to analyse.

With a sound-analyser many sounds can be recorded and played back through the computer, but the real point of interest is the ability to "train" your computer to recognise and react to certain voice commands! Di-Ren are already experimenting with vocal commands for their game Fleet Tactical Command, so that when the player shouts: "Hard to Port!" the computer (if it had been properly trained!) would turn his ship to the left!

A more serious application will be for people who have difficulty using a keyboard constantly for any reason.

For QL users, the DPR020 can be connected by using a **serial to 9-pin D connector lead** of the type already available for connecting their File Server program between a QL and PC. These leads can be obtained from **TF Services**, or home-made. Di-Ren's agent, Dilwyn Jones, will provide pin-out diagrams on request.

The sound analyser is expected to be ready by mid-November at a price of £67.50 - a bargain price for a sound analyser. The package will include the DPR020, a microphone, boxed speaker and instructions including sample programming techniques. Low-cost ready-made software to allow you to "train" your computer is expected to follow the release of the hardware.

Di-Ren are not taking cash orders just yet, but for more information and advance ordering forms, contact **Dilwyn Jones Computing, or Di-Ren at 59 William St, Walsall, West Midlands WS4 2AX**.

Reviewers wanted for QL World/DJC

Dilwyn Jones is now marketing software by Deltasoft, including the Flightdeck flight simulator and Image-D, a 3-D graphics program.

Flightdeck originally appeared in 1988, and is a real-time flight simulator based on a Boeing 737 twin-engine passenger airliner. The program comes with a database of over 200 UK navigation beacons, and the runway details of more than 25 major UK airports, including Birmingham, Cardiff, Glasgow, Heathrow, Newcastle, Norwich and two at Bristol.

There is a choice of three layers of cloud thickness; sounds effects on or off (jet engine, undercarriage movement, stall warning and tyre screen on landing); an accelerate option for the cruising phase of journeys; VOR/DME (VHF range/distance finding equipment), automatic direction finding and instrument landing system navigational aids; and a modest World Database option for expanded QLs.

Otherwise, Flightdeck will run on an unexpanded QL 3.5-in disk and cartridge options are available, cost £15 inclusive.

Image-D, originally marketed through PDQL, generates graphics of 3-D objects, and allows you to view them in different ways, including wireframe, hidden line and shaded. Perspective and magnification are under user control, and side-by-side front, side and plan views can be shown. Multiple objects can be defined and moved around to form complex objects, and defined objects can be edited and saved in a batch or individually. Image-D costs £10 inclusive.

Both programs are by Bernard Denchfield. They can be ordered from Dilwyn Jones Software. Cheques should be made payable to Deltasoft.

QL World would like reviewers for both programs, preferably established users of current or previous versions or similar programs. Please write with details to the Editor.

QL World is also looking for **reviewers** for the following new or re-released DJC programs: **S_Edit**; **Image Processor** - for tidying pictures generated by art programs, digitisers, scanners, Screen Snatcher, etc. Graphics printing for 9 and 24-pin Epson-compatible SM printers, or HP 500 Deskjet; **Convert-PCX** one-way file format converter for converting clipart from MS-DOS clipart libraries. Some experience of file transfer between computers desirable; **Grey Woolf** submarine warfare simulation; **Open Golf** - golf simulation with 50 courses; **Banter** - banner and postcard graphics program. Sideways printing for banners up to four pages wide with scalable outline fonts. All the former need expanded memory QLs. **Quizmaster 2** - a quiz game similar to those now found in clubs and pubs; and **DJ Toolkit**, a toolkit of SuperBasic extensions for the SuperBasic programmer or QLiberator compiler. These two programs will run on unexpanded QLs.

Anyone with a suitable set-up and relevant experience (or burning determination) to review one of these programs, please write to the Editor.

Additionally we are still looking for a current user to write a review of *Sidewinder*, and someone to review *Sidewriter*. Not to be confused! See Dilwyn's letter in **Open Channel** this month.

DJC

Dilwyn Jones Computing

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